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COMPUTERWORLD

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Users divided on System/38 bug complaint

By John Desmond
CW Staff

KNOXVILLE, Tenn. — A power failure hit the Dataman, Inc. real-time service bureau here recently just after an IBM System/38 user had invoked the transfer control command, a feature that can improve CPU efficiency.

When the power returned, the user's terminal came back with a different screen. With a little fiddling, a technician learned the terminal had defaulted to a command-entry screen, which appeared to bypass the System/38's security systems and give the user more than his allowed authority. Dataman President Glen McCown said he believed his shop had accidently uncovered a bug in the System/38's CPF operating system.

"When you get on this command-entry screen, which is tragic enough, it has some bizarre authority," McCown said. "You can get into any user's source modules, change them and recompile them." McCown wants IBM to change its operating system to prevent this default to a higher authority. He maintained that IBM's documentation does not clearly state that a power fluctuation can bypass system security.

But the issue is a divisive one in the System/38 community. Members of two IBM users groups and IBM itself acknowledge that the system can default to a command-entry screen and bypass certain security measures. But the parties disagree on who should be responsible for preventing the default.

See **BUG** page 4

Reagan systems security directive under attack

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — U.S. Congress members and others warn that a little-noticed presidential directive on computer security may give U.S. military and intelligence officials too much control over computer security at civilian agencies and in the private sector.

The controversy concerns National Security Decision Directive 145, which President Reagan signed last September but which is only now getting congressional and public scrutiny.

"My concern is whether this directive concentrates too much power in the National Security Agency over civilian areas," Rep. Dan Glickman (D-Kan.) said recently as he opened the first congressional hearing on the directive.

NSA and U.S. Department of Defense officials said the security directive is needed to curb the flow of sensitive information — including U.S. business and economic data — from highly vulnerable U.S. computers to adversaries. They said the NSA's role is appropriate because of the agency's technical expertise in information security.

But critics, such as Rep. Jack Brooks (D-Texas), the Institute of Electrical and Electronics Engineers, Inc. and the American Civil Liberties Union, questioned the broad scope of the directive and the leading role given to the military and intelligence communities.

The stated objective of NSDD 145 is to ensure the security of telecommunications and computer systems that process classified and sensitive government information and to provide security assis-

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TOP OF THE NEWS

Big brother is coming. A survey of IBM 3080 sites revealed extensive plans to dump some of the older mainframes once Sierra rolls off the line. **Page 2.**

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Running the micro-mainframe gauntlet. Micro-mainframe links must survive rigorous testing to make the grade in a GM laboratory. **Page 8.**

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AT&T will work harder than ever to free itself from regulatory constraints in the wake of IBM's plan to acquire 16% of MCI. **Page 9.**

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Thanks to a $2 million grant from IBM, the University of Texas will offer an MIS concentration to MBA candidates starting next fall. **Page 12.**

FYI

Users, vendors facing up to break-ins

Agencies' hacker troubles blamed on bulletin board

By Paul Korzeniowski
CW Staff

Adolf Cecula's worst fears were realized one night last August when a hacker brought down a computer at the U.S. Geological Survey in Reston, Va.

Cecula, information security administrator at the agency, reported that a hacker accessed the computer through the agency's connection to the Arpanet network, a packet-switching network operated by the U.S. Department of Defense. "The hacker probably learned of the telephone number and an entry-level password from a bulletin board," Cecula said.

The USGS has experienced four such incidents in the last year. Those incidents — and a growing number of others in the private and public sectors — indicate that hackers and bulletin boards are a common problem for government and commercial security administrators.

What made the most recent USGS case distinctive was that the hacker disrupted a system. Once in the network, the hacker located and found a default account. A default account is set up

See **HACKER** page 15

Product features reflect effort to enhance security

By Paul Korzeniowski
CW Staff

In reaction to threats from hackers or as part of evolving product lines, vendors have filled some security holes in their products.

"In our latest release of VMS, we incorporated a number of security features in response to hackers," said Peter Damon, VMS systems software marketer for Digital Equipment Corp. "After reading of cases from the newspaper or hearing from customers, we traced some cases and designed features to solve some problems."

One VMS item is an audit trail that tracks the number of times someone unsuccessfully tries to access a system. Most audit trails track only those resources users work with after they gain access to the system. The new trail serves as a red flag to security administrators. "A security administrator will notice a lot of activity at one account," Damon said. "It could be a hacker trying a random password method of cracking an account."

Another feature helps a security administrator confuse a

See **SECURITY** page 16

NEWSPAPER

Users planning to dump 3080s

Will make room for Sierras soon to roll off IBM lines

By Tom Henkel
CW Staff

FRAMINGHAM, Mass. — Despite IBM's insistence that its 3080 series is not a dying line of mainframes, users do not appear to be buying either the notion or the processors.

A recent survey of 860 3080 mainframe sites by International Data Corp. (IDC), a market research firm here, revealed that the users planning to get rid of their 3080s strongly outnumber those planning to buy new ones. Most who said they will dispose of a 3080 seemed to be eyeing IBM's newer 3090 line as a replacement.

More than 40% of the users polled said they have already placed 3090 Model 200 orders for delivery in the next 20 months. However, IDC noted that, traditionally, not all users who place an order for IBM mainframes actually accept delivery of the machines.

The firm also pointed out that its survey did not take into consideration current users of IBM 4300 and 3030 series systems, who might influence overall 3080 sales. Furthermore, the survey did not explicitly ask 3080 users about their field-upgrade plans.

Users of 3081s most interested in 3090s

The group most interested in the 3090 are users of 3081 CPUs. Of the 365 3081 users polled, 110 said they have either ordered or plan to order a 3090. In terms of actual orders, IDC said 3081 users have placed 163 orders for 3090 Model 200s and 22 orders for Model 400s. The 3081 users polled said they plan on removing a total of 100 3081 CPUs to make way for 3090s. Some 3081 users, however, still intend to install additional 3080 processors. Of the group polled, 21 3081 orders have been placed, and 12 orders for the 3084 processors are planned.

There are a number of 3084 users who said they have placed orders for the 3090 Model 200. IBM, in its February introduction of the 3090 series, stated that the Model 200 offers roughly the same internal performance of the 3084 Model QX. But of the 135 3084 users polled by IDC, 71 said they have placed or plan to place a 3090 order. The survey said the 3084 users have placed 158 orders for 3090 Model 200 processors and 41 orders for the larger Model 400 processors.

Far fewer users of the smaller 3083 CPUs said they are planning to buy a 3090. Of the 293 3083 users polled, only 12 have either placed 3090 orders or indicated they were giving the idea serious thought.

In terms of orders, 3083 users accounted for a total of 16 3090 Model 200 processors, and none have placed orders for the Model 400. But 3083 users did not appear to want to buy larger 3080 series processors, either. Of the 3083 sites polled, only 15 3081 orders had been placed, and only one user will add a 3084. Orders have been placed for eight 3083s, according to the survey.

Market ripe for uniprocessor 3090

The sluggish demand for larger 3080 machines by 3083 users makes the market ripe for the introduction of a uniprocessor version of the 3090, a machine IDC assumes will be called the 3090 Model 100.

"But history suggests that deliveries [of the Model 100] won't begin until mid-year 1986 at the very earliest," IDC said, noting that 1987 will probably be the peak year for 3090 Model 100 shipments.

Aside from the increased deliveries of 3090 Model 200 processors planned for the fourth quarter, 1985 appears to be a wash for IBM in terms of mainframe sales, but 1986, especially the first half, will be much better, IDC predicted.

History repeating itself

The upshot of the survey, IDC said, is that history is repeating itself. IBM traditionally experiences slumps in current-model mainframe sales every time it introduces a new line. IDC said similar slumps have occurred in 1965, in 1970, from 1976 to 1977 and in 1981.

Furthermore, the firm said, the current slump does not appear any worse than those of the past but has been exacerbated because this time IBM does not have the huge base of users leasing hardware to help soften the blow.

Potentially bad news for IBM is the high number of used 3080 CPUs that are being dumped on the market. This imbalance, IDC said, could lead to a strong downward pressure on 3080 residual values.

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A first user of the Wang Laboratories' Wang Office system finds that executives can use it right from the start/**10**

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Random access

A Cincom Systems spokeswoman recently confirmed that the Cincinnati-based vendor has decided to use the 1985 National Computer Conference as a launching pad for its new applications software for IBM mainframes and DEC VAXs. Although she would not release details of the announcement, the spokeswoman said Cincom's eleventh-hour decision to schedule an NCC press conference came after some internal debate over the appropriateness of the computer industry extravaganza as a forum for the introduction.

■

The first personal computer local-area network product to support more than one gigabyte of shared storage on a single server reportedly will make its formal debut next month from Nestar Systems, Inc. The new Plan 4000 B multifunction server is designed primarily for Nestar's existing large corporate customers, according to Peter Hertan, marketing vice-president of the Palo Alto, Calif., firm. "After about a year of use, they start to understand the need for the kind of storage they have on the mainframe," Hertan said. Users tend to move into new types of applications, often revolving around data base management tasks, and expand their networks, he noted. An average Nestar installation now supports about 25 micros.

■

Prime Computer is looking strongly at reconfiguring its 50 series minicomputer line for compatibility with General Motors' Manufacturing Automation Protocol (MAP). The company is developing an International Standards Organization Open Systems Interconnect-compliant local-area network based on IEEE 802.3 and 802.4 specifications. Prime is awaiting the expected September availability of chips from Intel and Motorola that will allow the testing of IEEE 802.4 protocols. Representatives from Prime, which is a member of the MAP users group, have been attending National Bureau of Standards workshops on MAP protocols, according to a company source.

■

It was show, but not tell, time for Encore Computer Corp. last week when the Wellesley, Mass., start-up demonstrated a 10-CPU version of its National Semiconductor 32032-based Multimax superminicomputer. The company was also offering details of two other products: a high-end version of its Hoststation terminal line, the Hoststation 550, and a National Semi 32016-based I/O processor called Annex. How much do these products cost, and when will they be available? Encore isn't ready to say, but it does appear eager to prove its new products aren't vaporware. Encore will be showing its latest products, sans price and availability, at the National Semi booth at NCC next week.

■

At NCC, the Irvine, Calif.-based Bell & Howell Computer Output Microfilm (COM) Division will reportedly announce a system that is said to make COM printing available to low-volume DP environments. The division traditionally makes COM products for medium- and high-volume computer centers.

■

At NCC, Britton-Lee is expected to announce a relational data base machine geared to IBM PC-DOS-based multiuser micros. A spokeswoman said the 100-user, $50,000-and-up machine, which will act as a data server for an entire network, will accommodate up to 10 simultaneous data base queries and will feature two 86M-byte disk drives and a 60M-byte cartridge tape back-up. The machine has been previewed for users and stockholders and is said to be compatible with the company's larger data base machines.

WHODUNIT

Sortland Yard warns against "Raffles-type sort programs."

Call (201) 568-9700.

Ask for Inspector SyncSort!

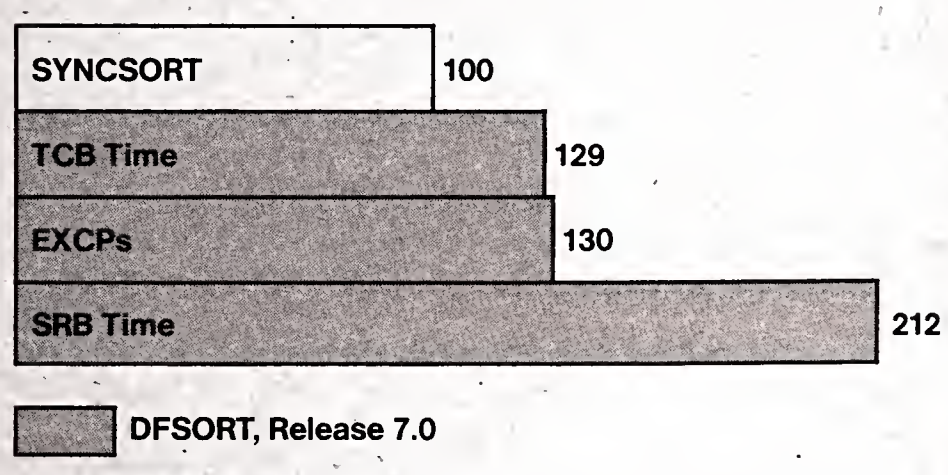
In an extraordinary move, Sortland Yard today warned data processors throughout the world to be on guard against what it termed "gentleman-bandit sort programs."

The warning was issued by one of the Yard's best known figures, Inspector SyncSort, who has sometimes been called "a legend in his own CPU time."

The inspector said, "One of the difficulties in apprehending these chaps is that they look so eminently respectable. They're members of a fine old hardware family. They've been to the right schools. And they invariably carry out their burglaries while wearing a dinner jacket from Saville Row."

EXPERT COMPUTER CRACKERS. "But once the party is underway," the inspector said, "these chaps head straight for the place where the family jewels are kept. They can crack open a computer and make off with a king's ransom in computer resources before you can say 'Hound of the Baskervilles.'"

To indicate "the true cost of this sort of misbehavior," the inspector released the following crime statistics:



SOMETIMES TAKE HOSTAGES. The inspector noted that these black-sheep programs often "take a dreadful toll" of programmers. "They are often tied up for days on end and forced to perform unnecessary coding, compiling and debugging. And they are heartlessly deprived of the labor-saving features that are taken for granted in most parts of the civilized sorting world."

Among these the inspector listed:

- **SORTWRITER**
- **MULTIPLE OUTPUT**
- **RECORD EDITING**
- **FAST FILE COPY**
- **MAXSORT**

TELEPHONE BEST DEFENSE. The inspector urged data processors to call the Yard immediately if they suspect their center is infested by a Raffles-type sort program. "The number is (201) 568-9700. We'll send over one of our highly trained sort detectives to track the culprit down."

Questioned as to what would be done with sort programs caught burglarizing computer centers, the inspector replied. "They will be given a just and speedy trial. If found guilty, they will immediately be transported to Iran!"

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

BUG from page 1

The founder of the Northeastern System Thirty-Eight Users, Inc. (Nestu) said certain additional coding can prevent an ordinary user from obtaining higher level authority. The System/38 hot-line coordinator for Common, the IBM users group, believed that the user has discovered a fault in his own security and not in IBM's code. An IBM spokesman said, "The System/38 does not have a data security problem."

McCown said that while the authority of the command-entry screen was considerable, it was not equal to that of the security officer, who has the highest level of access on the system. McCown said he was not able to execute a command that displays all users' passwords, which the security officer is allowed to do. But McCown said he was able to recompile and delete a program from the command-entry screen. The user profile he accessed should not have been capable of such a deletion, he said.

"Clearly this is not what IBM intended. There is no way in the world that all the System/38 users around the world have spent the money and time to build security systems to have them mean absolutely nothing," McCown said.

IBM's customer service representatives here have told McCown to avoid the problem by not using the transfer control command. According to McCown, they said the problem was not unexpected after a power fluctuation and thus is not a bug. "That is patently absurd," McCown responded. "They're obviously avoiding the situation." McCown said IBM previously encouraged use of transfer control, both in the command language manual and in the programmer's guide.

Serious implications

The implications of the security breach are significant, in McCown's view. "We all know the capabilities of the so-called hackers all across the country and what they can pull off not knowing anything. This baby puts you halfway into the heart at first blush," he said.

The existence of the default to a command-entry screen was verified by Gary Keith, vice-president of Magnatron, Inc., a software firm based here specializing in System/34, 36 and 38. For the security breach to occur, Keith said, a user would have to time a fluctuation of the terminal's power just right.

Keith said System/38 programmers are not generally aware of the default procedure. For IBM to make systems programmers responsible for avoiding the potential breach is outside the philosophy of the System/38's CPF operating system, he said. "That type of responsibility is typically not put on us. In my opinion, the problem is a security breach of the command-entry screen. [IBM] has chosen to lay the responsibility on us as programmers to solve the problem. That's a typical response, but I don't think it's appropriate," Keith said.

The System/38 hot line coordinator for Common, Gene Gellman, director of information services for Cyro Industries of Sanford, Maine, said he finds the existence of the security breach hard to believe: "I maintain that what this person has found is a breach of his own security and not a problem with IBM's code. I see no reason why going to a command-entry screen is a problem from a security point of view."

William Petrone, founder of Nestu and director of technical services for Computer Software and Services, Inc. of Spencer, Mass., said it is possible for a user to obtain higher authority on a command-entry screen, but he does not consider that a bug. "I don't consider that a flaw, because transfer control is basically [there] to help the user. IBM is probably reluctant to change that, because no one has complained about it."

Error-handling program recommended

The IBM spokesman said the System/38's operating system, as delivered, will sign off a user after a power fluctuation. The system interprets the power fluctuation as an error. IBM recommends that users write an initial program to handle errors. But by doing so, the user can inadvertently revert to a command-entry screen after a power fluctuation, the spokesman said.

Nevertheless, IBM is reluctant to change the recommendation to write an initial program. "We don't want to preclude any of the user's options. But the user needs to be aware of what can happen if certain options are chosen," the spokesman said.

Gellman said he would not want the default sequence reported to IBM as a bug. "I don't want IBM to deal with it, because they take away your flexibility when they do," he said.

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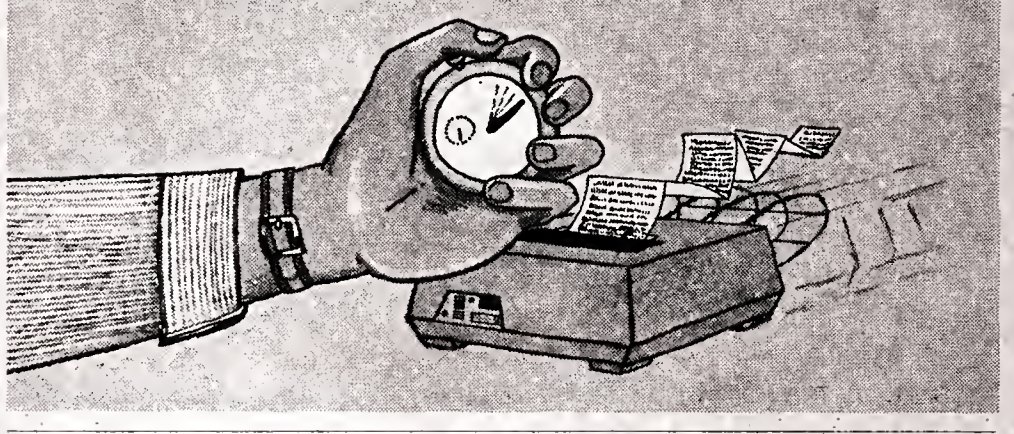

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Sale of Harvard Software set

MOUNTAIN VIEW, Calif. — Software Publishing Corp., the publisher of the PFS line of microcomputer software products, announced last week an agreement in principle to acquire Harvard Software, Inc. of Littleton, Mass. No price had been disclosed at press time.

The acquisition is subject to the approval of a definitive agreement by both boards of directors. Harvard Software developed and markets Harvard Project Manager and Harvard Total Project Manager.

Fred Gibbons, president of Software Publishing, which had revenue of $23 million and profits of $3.2 million in 1984, said the Harvard Software name is a leading brand in project management software.

Shakeel Mozaffar, vice-president of marketing for privately held Harvard Software, said the formal details under which the company will be acquired have not yet been finalized. He said Harvard Software had about 50,000 packages installed by the end of 1984.

According to Mozaffar, Harvard Software had captured about 50% of the market for project management software among Fortune 1,000 companies and needed "fundamental access to the low end of the market."

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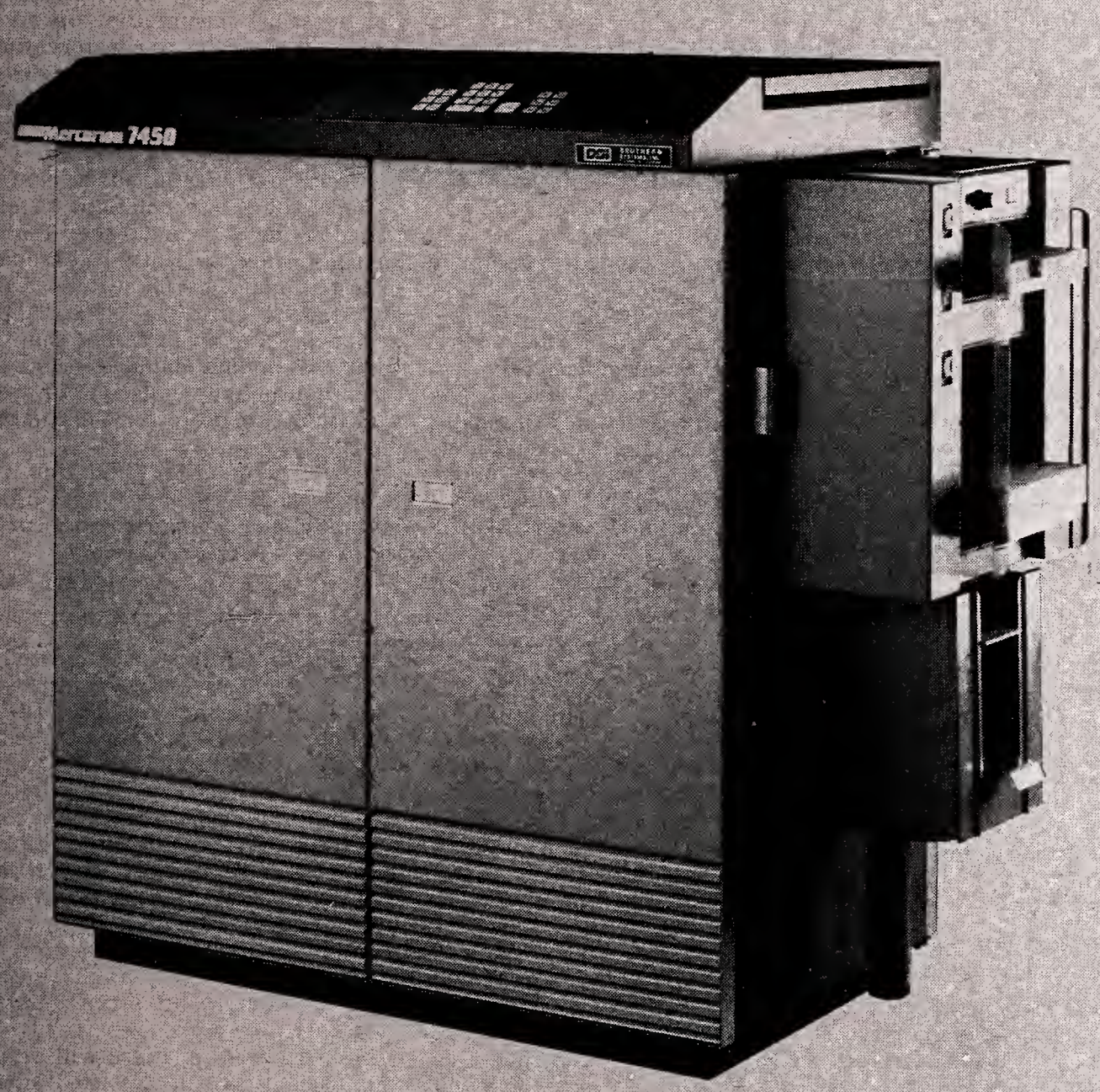

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Reagan DP security mandate raises congressional ire

Measure said to usurp legislators' authority

WASHINGTON, D.C. — President Reagan's controversial directive on computer security created an elaborate policy-making organization to provide governmentwide direction on telecommunications and computer security.

National Security Decision Directive 145 (NSDD 145) established a four-part organization as follows:

■ T Systems Security Steering Group, chaired by the president's national security adviser, to provide overall direction.

■ The National Telecommunications and Information Systems Security Committee (Ntissc), a panel of 22 agency heads that considers technical questions and sets policy.

■ The Executive Agent, who is the secretary of defense.

■ The National Manager, who is the director of the National Security Agency (NSA) and who implements the Ntissc's policies.

Warren G. Reed, director of the information management and technology division of the U.S. General Accounting Office (GAO), said a positive feature of the organization is that it provides the central leadership on computer security previously lacking in the federal government.

On the other hand, Reed said, the directive may also create confusion over who has responsibility for information security in the federal government.

The Office of Management and Budget, the General Services Administration and the National Bureau of Standards (NBS) now have statutory authority to set policy and standards for government information systems.

Usurped congressional authority

Rep. Jack Brooks (D-Texas), chairman of the House Government Operations Committee, said the Reagan administration usurped congressional authority by issuing the directive, which he said conflicts with existing statutes.

Brooks said the directive should be withdrawn. "The corridors of the Pentagon and the offices of the East Wing of the White House are not places in which national policy should be established," Brooks said. "The importance of this issue demands public hearings and a full debate in the Congress before the national policy is set."

Brooks also suggested that implementation of the directive could be thwarted by the congressional appropriations committees, if they deny funds for its implementation.

Rep. Dan Glickman (D-Kan.) said he is troubled by the lack of public and congressional input in the formulation of the directive as well as by the apparent dominance of the organization by national security officials.

Glickman and Brooks recently sponsored legislation to enhance the computer security efforts of the NBS, suggesting that the NBS would be the more appropriate agency for government standards.

The bill, H.R. 2889, would provide the bureau with $1 million a year for research on computer security and would require federal agencies to provide training in computer security techniques for federal managers.

Jerry Berman, legislative counsel to the American Civil Liberties Union, said NSDD 145 raises important information and privacy policy issues that should receive more congressional oversight.

Consequently, Berman urged Congress to create a Select Committee on Information.

"Only the direct involvement of Congress can ensure that openness and personal privacy considerations are given their full due in the development of [telecommunications and computer] security policy," Berman said.

Critics also questioned the composition of the Ntissc, calling it a "military-dominated" committee. Ten of the 22 members of the Ntissc are from national security offices in the government, according to the GAO.

But Ntissc officials denied that the committee is dominated by the military, pointing out that civilian agency officials are quite vocal in committee meetings.

Furthermore, they said that the NSA is a service agency — providing both intelligence reports and security services — not a military one.

— Mitch Betts

DIRECTIVE from page 1

tance to the private sector.

To accomplish this, it established an elaborate organization, including a 22-member National Telecommunications and Information Systems Security Committee (Ntissc) chaired by an assistant secretary of defense and a National Manager, who is also director of the NSA.

U.S. 'being bled to death'

Donald C. Latham, chairman of the Ntissc, defended the president's directive on the grounds that U.S. computer systems are extremely vulnerable to security breaches, and consequently, the U.S. is "being bled to death" by losses of technical information.

Walter G. Deeley, deputy director of NSA for communications security, said foreign countries such as the Soviet Union use on-line commercial data bases in the U.S. to obtain technical data and also to intercept the industrial communications of Fortune 1,000 companies, thus hurting the U.S. economy.

The directive also created a category of information below the traditional classifications and referred to it as "sensitive but unclassified government or government-derived information" whose loss could harm national security.

Big Brother really here

"It means that Big Brother is really here," Rep. Brooks said at the hearing. "I seriously question the wisdom of the president's decision to give [the] DOD the power to classify, hence control, information located in civilian agencies and even the private sector, which, in [the] DOD's opinion, may affect national security," he testified.

The U.S. General Accounting Office said the scope of the new computer security organization will depend on how broadly the Ntissc defines the new category of sensitive information, a category which could include government information on hazardous materials, flight safety and the Federal Reserve Board's monetary policy.

Asked how the Ntissc will define this sensitive, unclassified data, Latham responded that the committee is "heatedly debating that right now." He suggested the data might include banking transactions, medical records and Social Security records.

Mid-range security classes

These information systems would require a lower level of security than military computers, he said. For example, they might be assigned a security level of C-1 or C-2, which are mid-range security classes defined by the NSA [CW, Sept. 17].

John M. Richardson, testifying for the IEEE, said the society is concerned about the extent to which NSDD 145 "seems to reach into the operation of private sector activities and systems."

Richardson urged the government to exercise "extreme restraint" in this area and to limit its role simply to alerting the private sector to security problems and to encouraging remedies.

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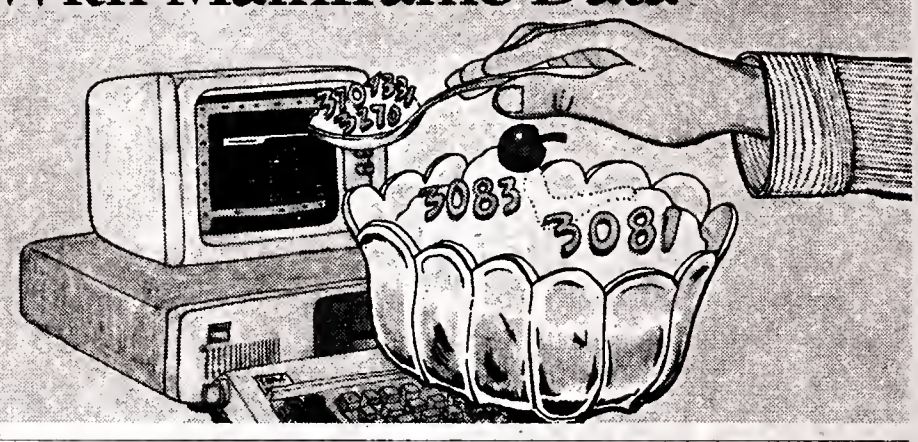

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Atlanta	Jul 25, Sept 18	Indianapolis	Sept 17	Rochester	Jul 23
Austin	Aug 6	Kansas City	Sept 12	Sacramento	Aug 8
Boise	Jul 30	Los Angeles	Jul 25, Aug 27, Sept 26	St. Louis	Aug 8
Boston	Jul 16, Aug 14, Sept 17	Minneapolis	Aug 1	Salt Lake City	Jul 16, Sept 24
Chicago	Jul 17, Sept 19	New Orleans	Aug 13	San Diego	Sept 10
Cincinnati	Sept 10	New York City	Jul 31, Aug 14, 28, Sept 11, 26	San Francisco	Aug 1, Sept 5
Cleveland	Aug 6	Newport Beach	Aug 14, Sept 17	San Jose	July 25, Aug 15, Sept 26
Dallas	Jul 16, Aug 8, Sept 11	Oklahoma City	Sept 17	Tulsa	Aug 15
Denver	Jul 18, Aug 13, Sept 19	Omaha	Aug 7	Washington	Jul 24,25, Aug 8, Sept 12, 26
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NEWS

GM technical unit test-drives links in laboratory trials

By John Desmond
CW Staff

WARREN, Mich. — Before a micro-mainframe link is accepted by General Motors Corp.'s technical group here, the link must survive a communications gauntlet of emulation boards, data switches and multiple types of hardware.

In a laboratory setting at the GM Technical Center here, the Advanced Product and Manufacturing Engineering Staff (Apmes) subjects micro-mainframe link products to a rigorous series of tests. Most available micro-mainframe links fail to meet the company's need to send data along some labyrinthian paths. "The more diverse you are and the larger environment you have to work in, the more difficult it is to find one product to meet all your requirements," said John Crombe, Apmes personal computer liaison and technical engineer.

In the micro-mainframe arena, Apmes' goal is to allow its 341 current IBM Personal Computer XT and AT users to communicate with each other's personal computer and with processors from IBM and Digital Equipment Corp., according to Crombe. In an ambitious program, Apmes plans to add another 200 personal computer users by year's end, Crombe said.

Apmes, which receives computer services from GM's DP subsidiary, Electronic Data Systems Corp., is a technical staff of hundreds that develops and plans engineering systems for future use at GM.

Data follows many paths to and from Apmes end users. Over dial-up lines from the personal computers, the asynchronous data is routed to the mainframes through a Gandalf Data, Inc. data switch and an IBM Series/1 minicomputer used as a protocol converter. The Series/1 is the gateway through which all microcomputer data destined for mainframes must pass. Once the Series/1 performs the necessary protocol conversion, the data is passed on to an IBM 4381 or 4341 mainframe or to a Digital Equipment Corp. VAX-11/780 or an 11/750 supermini. The IBM mainframes work in both MVS/TSO and VM/CMS environments.

Data is also channeled from personal computers equipped with terminal emulation boards through coaxial cable into IBM controllers and then into the mainframes.

'Most links aren't smart enough'

Most available links support connections between one type of micro and a single manufacturer's processor — and do not support the code, protocol, file format and other conversions needed for a micro to access multiple types of hosts. Crombe said, for example, "Most asynchronous file-transfer micro-mainframe links do not allow you to link through a Series/1 protocol converter. You might say they aren't smart enough. There are a lot of characters that get translated and stripped out on the way through. It has to be a pretty smart protocol to get binary files transferred through there."

A key requirement is that the link provides for transmission of text and binary files. "It's pretty simple to send text only," Crombe said. Text requires Ascii characters representing uppercase and lowercase letters A to Z and punctuation marks. "That leaves a lot of Ascii characters to use as control code," such as the code needed to signal the end of a transmission, he said.

With binary data transfer, he said, "No characters are illegal. If you have a character that signals end of transmission, and your binary file uses that same character, it means you have to transform that character into something else, and the end program transforms it back to original state," he said. The encoding and decoding further complicates communication. "The more things you have to encode into a different format and decode on the other end, the more you have a delay in speed. Plus you have more data to be sent down the line. Those are factors to consider," Crombe added.

To meet these conversion demands, Crombe investigated some two dozen link products. The first-stage requirement was that the link had to support data transmitted through the Gandalf data switch and through various IBM 3270 emulation boards, including Forte Data Systems, Inc.'s Forte; CXI, Inc.'s Pcox/CXI; Digital Communications Associates, Inc.'s Irma; and IBM's 3270 board. "When you say you want to talk through Forte, Irma, Pcox and a modem at 9.6K [bit/sec.] directly to an IBM mainframe, that knocks half the list out. Then when you say you want to talk to Series/1, that knocks just about everyone else out. Then when you say you want to talk to a VAX and send for text and binary files, everybody's gone," Crombe said.

Slim micro-mainframe pickings

While the micro-mainframe pickings are slim from Apmes' point of view, the group is impressed with Linkware Information Service from Linkware Corp. of Waltham, Mass. "Linkware's product was the only one that fit the criteria," Crombe said. "There are individual products that may provide individual links superior to any one particular link that Linkware might give you, but none of them give you the whole picture."

Using Linkware, he said, "We personally did binary and text file transfers from the micros to the VAX and IBM mainframes through the Series/1. We did the coaxial connect file transfers up and down through the 3270 cards. We also evaluated the security access control, [which determines] who is allowed to read and write certain files in the central library." A list of 500 files was created by Apmes to test delays caused by making a large directory available to personal computer users.

To evaluate whether a transmission was successful with Linkware, Crombe performed a loop test. He sent data from the host to the personal computer, then back up to the host under a new file name. He then compared the two files on the host, bit for bit. He did the same loop test going from the personal computer to the mainframe, then back to the personal computer. He also examined text files from the personal computer to the mainframe, where Ascii code was converted to Ebcdic and vice versa. And he checked binary data from the personal computer to the mainframe for accuracy.

AT&T joins forces with Japanese consortium in net venture

NEW YORK — AT&T announced last week that it has formed a joint venture with a consortium of Japanese companies, including two mainframe vendors, to build a data communications network in Japan.

Announced in Tokyo, the agreement established Japan ENS Corp. for the purpose of developing a value-added network based on AT&T's Enhanced Network Services technology.

James S. Hubley, formerly director of international and network product management with AT&T Information Systems, will be the senior AT&T executive involved in the venture. AT&T's partner is Japan ENS, Inc., a consortium established in 1984 to investigate enhanced network services. Hajime Hirota, president of Japan ENS, Inc. and former managing director of the Industrial Bank of Japan, will also play a leading role in the venture, an AT&T spokesman said.

The spokesman said the equity holdings for AT&T and the 17 Japanese firms involved in the venture have not been finalized, and the details will be worked out during the summer. AT&T will provide the network technology and the resources to design, engineer and operate the network, along with management for network operations and product planning and development.

'Venture will compete with NTT'

The opportunity to develop value-added data nets in Japan is a result of the Japanese government's decision in April to allow competition in its domestic communications marts. Previously, Nippon Telegraph & Telephone Corp. (NTT) enjoyed a regulated monopoly over communications.

"In that prior to April NTT was the only company doing anything in this area, the venture will certainly compete with NTT," said AT&T's Barry Campbell.

Other companies, Campbell noted, are also seeking to establish data networks in Japan. According to the Framingham, Mass.-based market research firm, International Data Corp., IBM previously established two joint ventures to pursue value-added network opportunities. The two ventures, Advanced Systems Technology Development, Inc. and Advanced Systems Technology, Inc., were formed in partnership with Mitsubishi Corp., an electronics conglomerate that has previously worked on projects with IBM, and Cosmo Eighty Corp., a software development firm.

The members of the Japanese consortium in partnership with AT&T represent a wide range of Japan's leading industrial, financial and service companies. Included in the consortium are mainframe vendors Hitachi Ltd. and Fujitsu Ltd., along with Industrial Bank of Japan, the Asahi Shinbun press organization, Sony Corp., Mitsui & Co., Nissan Motor Co. Ltd. and Nippon Life Insurance Co.

AT&T said the planned network will enable Japanese industries to let dissimilar terminals and computers communicate over a shared intelligent public network.

Later this year, AT&T said, a wide-area packet network service will be implemented with network access provided through packet assemblers/disassemblers in nine cities. Early next year, the venture is expected to provide full value-added network services, with Net 1000 storage and processing technology available.

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IBM-MCI alliance to aid AT&T's deregulation quest

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The proposed IBM-MCI Communications Corp. business alliance [CW, July 1] is adding fuel to AT&T's campaign to have regulations relaxed or dropped which bar AT&T's joint marketing of telecommunications with office equipment and computers.

Specifically, AT&T is using the alliance as proof that a highly competitive market exists, as it presses the Federal Communications Commission to slacken existing restrictions that bar AT&T from combining sales of its new minicomputer and microcomputer lines, local-area networks and enhanced data communications services with the regulated long-distance telephone service.

IBM and other large computer manufacturers, such as Digital Equipment Corp., have said they do not oppose the removal of the rules barring AT&T from joint marketing of regulated telephone service and nonregulated computers and equipment embodied in the Second Computer Inquiry decision as long as separate accounting is maintained to prevent cross-subsidy.

Forced to spend extra

AT&T is arguing that the restrictions are unnecessary in a highly competitive equipment market and are causing the company to spend an extra $10 billion to duplicate functions that are performed by AT&T Information Systems, the nonregulated equipment subsidiary, and by the regulated AT&T Communications.

The FCC will decide shortly on removing the Computer Decision II ban on AT&T's joint marketing as part of its overall shift away from the regulatory regime it had built around AT&T before divestiture. Earlier this year the commission granted permission to AT&T to shift $1.9 billion worth of plant and equipment from AT&T Technologies to AT&T Information Systems [CW, April 22].

Last week, a former architect of the separation policy and a former member of the Justice department's antitrust division, Phil Verveer, said, "The most interesting aspect of the IBM-MCI deal is what impact it will have on the FCC. I expect it will push them toward a more rapid deregulation of AT&T."

An FCC official working on the pending ruling to drop the Computer Decision II restrictions said last week, "To the extent that the IBM-MCI deal affects the market share for the equipment industry, I think it will affect the decision. The commission has said market share will be a factor in its decision."

While IBM and DEC are not opposing the joint marketing, they are asking the FCC to require information disclosure by AT&T as far as technical changes it makes to the network, especially as the network moves toward an Integrated Services Digital Network mode of transmission.

The companies point out in comments to the FCC that equipment interfaces to the network will be highly dependent on the protocols and standards adopted by AT&T. They assert that AT&T's network interconnect standards for equipment do not match those established by the International Standards Organization.

Other safeguards being pushed on the FCC by IBM and DEC would have AT&T continue to keep separate the revenue from the regulated basic transmission service from the nonregulated computer and equipment side and would require that AT&T pay the tariffed transmission rates for a joint service offering as others are currently forced to do. Additionally, they would require that an outside independent accounting review of the integrated services be conducted annually.

Verveer, commenting on the pressure the IBM-MCI deal is putting on the FCC as it considers its regulatory treatment of AT&T, added, "I expect the FCC will move toward more rapid deregulation. They are strongly inclined to relax the equipment separation rules, deregulate AT&T's long-distance business as well as the [divested] Bell operating companies and find any means of doing so. To that extent, the IBM-MCI deal will probably be cited as a factor."

Last week there were other evidences of the building pressure:

- Recent comments emanating from the FCC have thrown the competitive long-distance industry into an uproar. Common Carrier Bureau Chief Bert Halprin remarked that the FCC is not disposed to continue preferential terms and conditions for hookups by AT&T's competitors to the local telephone exchanges.
- GTE Sprint Communications Corp., Allnet Communications and other long-distance competitors have filed an emergency petition with the FCC citing the difficult business conditions they are faced with from added costs and pleaded for easier regulatory treatment while equal access is being implemented by the local-exchange telephone companies.
- The FCC last week floated a trial balloon idea, according to telecommunications industry lawyers representing these principal long-distance competitors, about letting the regional holding companies into the interstate long-distance business, from which they are specifically barred by the terms of the AT&T divestiture.

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- GETMAIN and FREEMAIN—to acquire and release main storage
- ABEND—to force your task to end abnormally

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OA system keeps firm's execs on top of business

By Donna Raimondi
CW Staff

BEDFORD, Mass. — The chief executive officer of a company here decreed that there was no better way for his corporation's executives to learn about technology than with hands-on experience. So he went out and bought them a Wang Laboratories, Inc. Wang Office system.

GCA Corp. became one of the first users of the Wang Office, said Glenn Fund, GCA's manager of end-user computing. The company manufactures automated production systems used for making integrated circuits for semiconductor makers. It also supplies integrated factory automation hardware and software systems for automotive, aerospace and electronics companies.

Fund credits the office automation system with speeding the work flow and giving GCA's executives the ability to react quickly to business situations, he said. When Milton Greenberg, GCA's CEO, gave Fund's group responsibility for finding an office system for the executives, the choices were somewhat limited. GCA already had IBM and Wang equipment and was committed to staying with those two vendors, and IBM had no OA system available at the time, Fund said. By the beginning of May, GCA had installed the Wang Office system for its executives and their secretaries, he said.

The company bought several standard Wang Office software modules and customized other functions that it wanted, Fund said. Standard modules that GCA purchased included Wang's word processing; the Reminder File; the Local Mail facility for sending and receiving memos and phone messages; the Personal Phone Directory; the daily, weekly and monthly Calendar module; and the List Management data base package.

Custom-developed functions include an on-line company telephone directory, which is downloaded from GCA's IBM 3083 mainframe, and a tie-in to Western Union Corp.'s Easylink electronic mail service, which provides access to information such as treasury, stock market, weather and news, Fund said. Telecommunications options such as the TTY asynchronous and 2780/3780/WPS bisynchronous Wang-to-Wang connection protocols were also developed. The customized portions were created by the GCA staff with Wang software specialists, he added.

User's needs surveyed

GCA arrived at its choices of features and functions by surveying the executives and secretaries who would be using the system to find out what they needed and wanted, Fund said. Fund discovered that personal information, including reminder files, message services and telephone information, and corporate information such as sales, bookings and financial data, were the two basic types of data that people wanted. Up to now, he has concentrated on developing the personal features of the system. The corporate information will come later as he brings mainframe applications to the Office system.

The company bought tutorial books from Ad Verbum in Acton, Mass., for teaching word processing and for creating glossaries, said Marge Snowdon, GCA's executive VS office system administrator. The glossaries allow the cataloging of documents that can then be called up and inserted in other documents, she said.

GCA acquired a 1M-byte Wang VS85 with two 75M-byte disk drives for the initial system, which is a pilot currently serving 26 users. Users of Wang Office Information Systems 50 and 60 word processing machines that the company already owned were linked to the VS so they could access the new functions.

Wang should have provided much more assistance and start-up help, Fund said. The system is more complex than many OA products and requires a sophisticated group of people to put it in, he added. "We know more than Wang knows about the system now," he said.

The initial 26 users do not all have the same functions available to them, Fund said. Security levels are set by the system administrator, and as soon as users enter their identification numbers, the system knows which menus the users are allowed to access and which peripherals they have access to.

Training users for the system was a challenge, Fund said. His staff pulled together a manual for the system in four to five weeks' time, he said. "Wang had terrible documentation," Fund said, and even the terrible documentation was not available when he bought the system. The staff wrote their own manual using pictures, examples and features such as program function keys and menus. They could not work on the manual until they had the system developed and ready to install, he said.

Because of GCA executives' busy schedules, no training sessions could be planned for them, Fund said. Secretaries were trained first so that they could help their bosses learn when they had time, he said.

Secretaries took two-hour training courses, Snowdon said. A few of the secretaries had prior experience with

See WANG page 11

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NEWS

ADR tightens micro line with link boost, integrated tool

By John Gallant
CW Staff

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) last week bolstered its microcomputer software offerings with introductions of an enhanced release of its micro-mainframe link and a multifunction productivity package for IBM Personal Computers.

Unveiled here were PC Datacom 2.0 and PC Peer. PC Datacom 2.0 is an upgraded version of PC Datacom, which gives IBM Personal Computer users access to data residing in ADR's Datacom/DB relational data base management system for IBM mainframes.

The enhanced PC Datacom link now supports widely used micro software data formats, including comma-separated values, Data Interchange Format, Symbolic Link Format and ADR's own format for data reporting.

In addition, PC Datacom 2.0 now supports data exchange with Lotus Development Corp.'s 1-2-3 and Symphony and Ashton-Tate's Dbase II, Dbase III and Framework.

A spokesman said the link allows users to download mainframe data and invoke a menu option that automatically reformats the data for the supported micro formats and packages. Users can also update Datacom/DB from the micro through PC Datacom.

The spokesman said the enhanced release also features a report writing facility that is said to allow micro users to create standard and custom reports using mainframe- or micro-generated data.

All PC Datacom procedures are menu driven, and queries can be created on the micro through the menu or ADR's mainframe Dataquery language.

ADR's PC Peer is an integrated micro software package that combines spreadsheet, graphics, data and forms management and telecommunications capabilities. It can share data with mainframe Datacom/DB through PC Datacom 2.0. PC Peer offers split-screen capability that allows data and graphs to be displayed simultaneously.

The spokesman said the product's forms manager allows users to create invoices, mailing labels and form letters. Documents produced with the word processor can contain text, data tables or graphs copied from other PC Peer facilities.

PC Peer's telecommunications facility supports asynchronous communications using a serial port and a Hayes Microcomputer Products, Inc. Smartmodem or a Digital Communications Associates, Inc. Irma board for IBM 3270 communications.

The package runs under IBM's PC-DOS and requires 512K bytes of random-access memory on an IBM Personal Computer, Personal Computer XT or AT. It is available now at $595 per copy.

PC Datacom 2.0 costs $495 per copy and will be available in the third quarter.

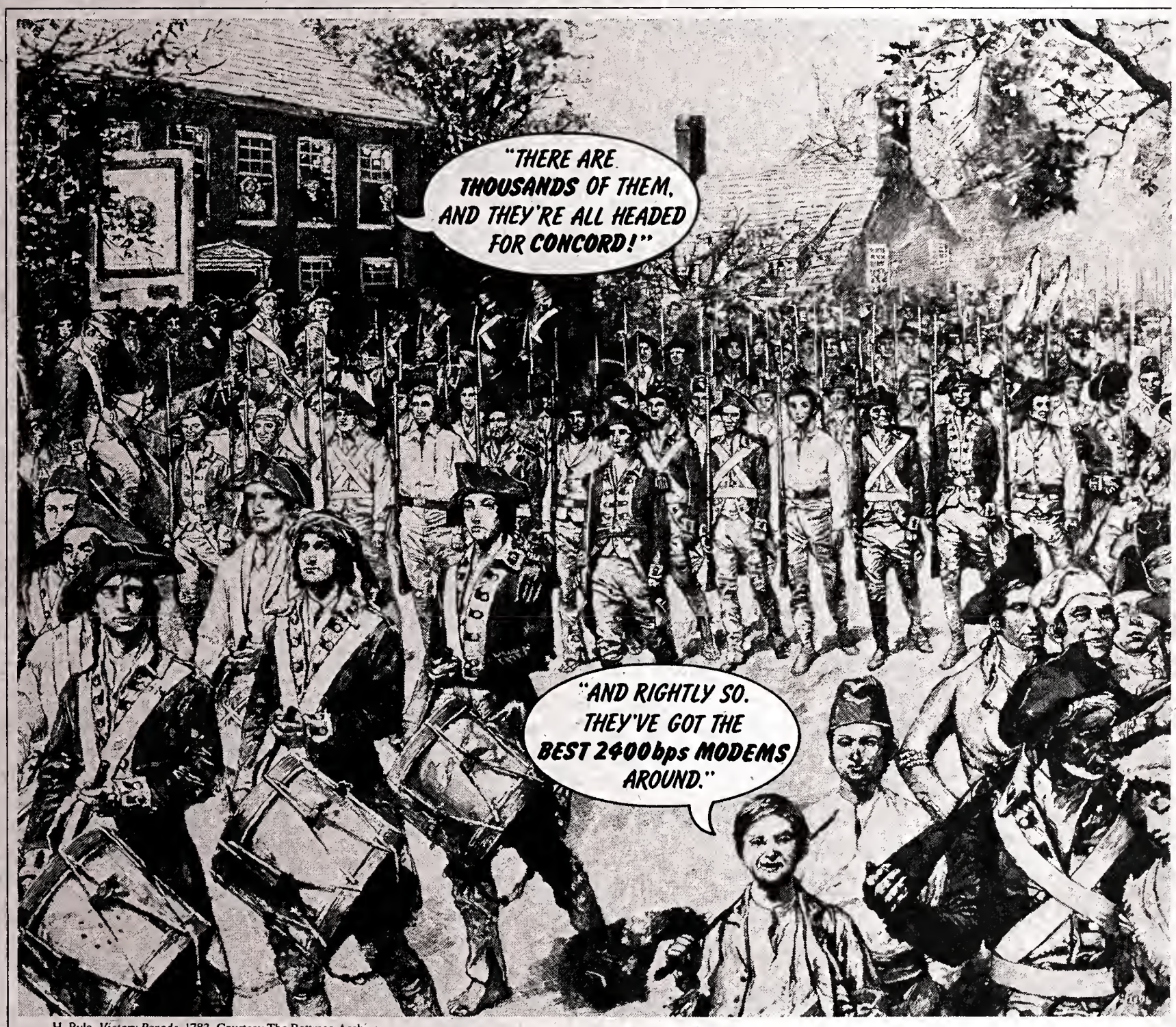
ADR is located at CN-8, Rt. 206 and Orchard Road, Princeton, N.J. 08540.

WANG from page 10

Wang word processing machines, but most of the secretaries and all of the executives were using computers for the first time, she said.

The staff is working with Wang to improve some of the system's features, Fund said. Wang recommends that the shared printers, for instance, be dedicated to either word processing or to office functions or else documents will appear to be hung up, which causes system administration problems.

The system is expensive, Fund said, so it may be a while before everyone in the organization has access to it. "If we are able to sign a multimillion-dollar contract because we could react quickly, it will pay for itself," he said. The benefits are in the ease and speed of automatically doing jobs that were previously done manually, he said.



H. Pyle. *Victory Parade*, 1783. Courtesy The Bettman Archive.

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IBM grant launches MIS program for University of Texas

By Clinton Wilder
CW Staff

AUSTIN, Texas — The Graduate School of Business building was not the most pleasing sight on the scenic campus of the University of Texas here this spring. Where other buildings were flanked by the green, well-trimmed lawns one expects at a large Sunbelt university, the business school was surrounded by freshly dug dark earth and stacks of cast-iron pipe. Inside, too, the ravages of renovation dominated the academic setting. It was apparent there was a transition going on.

By next fall, the university will open its "Classroom 2000" — an ultramodern, multitiered room decked out with what university officials say will be the world's largest IBM Personal Computer AT/370 collection in one room. The 64 AT workstations were purchased with part of a $2 million grant from IBM, funds that will allow the school, along with 12 other universities nationwide, to offer an MIS concentration in its MBA program for the first time.

> *'We believe there has been a void between the academic and business worlds.'*
>
> — Darwin Klingman
> University of Texas

"We believe there has been a void between the academic and business worlds," said Darwin Klingman, the management science and computer science professor who will direct the MIS concentration. "In the history of computers, the early machines were designed totally in universities, but now it's the vendors who are at the leading edge. The universities can't afford multibillion-dollar computer research, but the educational function can come back into it because business needs management expertise to manage those systems."

University of Texas professors will begin training an estimated 75 MIS concentration candidates next fall to fill what they said they believe is a corporate management gap between the computer science-trained DP manager and the corporate vice-president with an MBA. Their goal is to integrate all of the standard MBA topics — marketing, finance, accounting, management and general business — into a curriculum designed for the MIS environment.

"The 'of' in management of information systems is very important," said Associate Professor of Management Robert Sullivan. "We've identified a vacuum between top management and DP, and we hope to fill the void between managers and number crunchers with these people. They should have the ability to interact with vice-presidents, cost-out systems, be sensitive to user interfaces and behavioral aspects and be able to facilitate getting terminals on the desks of decision makers."

According to graduate school officials, ideal MIS candidates will enter the program with most of the required computer technology courses, such as Pascal programming and data structures, behind them. "The majority will be able to waive one or two courses by having backgrounds in data base management and several programming languages," Sullivan said. "The admissions standards for this concentration are distinctly separate from those for the regular MBA program."

The IBM grants, announced in April, were earmarked at 50% for hardware and 50% for faculty and curriculum development. The university claims to be the only grant recipient to spend the hardware component completely on end-user workstations rather than on a host processor. Thanks to a previous IBM grant to its engineering school, the University of Texas already had an IBM 4341 mainframe as well as an IBM 3081 Model D.

"We wanted to keep up with the latest technology on the micro-mainframe link and local-area networking," Klingman said. "We think that's a critical part of information system management today."

Want city's business sector involved

Business school officials also hope to see the MIS concentration grow along with Austin's high-technology private sector, which includes a move to a new University of Texas building next year by a corporate research consortium, Microelectronics and Computer Technology Corp. Committees of advisors from the business community will be established to maintain close contact between the new university program and business.

"We want to make sure we're not running behind industry's needs in terms of our training," Klingman said. "And we would like to get top business leaders to lecture or teach."

The business school's transition to

See **TEXAS** page 13

Every programmer should have one...

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Oil firm opts for limited use of IBM Cabling System

By John Desmond
CW Staff

NEW YORK — When IBM announced its Cabling System last year [CW, May 14, 1984], a major oil company in Ohio put a hold on twisted-pair cable orders for its new 45-story headquarters building, evaluated the IBM cable and decided to stick closely to its original plan.

Some twisted-pair cable, to be used in a private branch exchange (PBX) network, had already been shipped to Standard Oil Co. of Ohio (Sohio), and other orders were on loading docks when IBM made its announcement.

Les Duncan, manager of corporate telecommunications for Sohio, said that after the evaluation, his firm decided to make only a small investment in the IBM Cabling System for its headquarters, which he said will be the largest office building in Ohio.

"We question how universal the cable will really be for non-IBM products," Duncan said, addressing an office automation conference sponsored by the Boston-based Yankee Group here recently. Sohio decided on a limited role for IBM cable after company engineers inspected the product and talked to IBM engineers and beta users, he said.

"IBM type II cable [multiwire general type] would have cost 2½ times more than standard telephone wiring," Duncan said. Moreover, standard IBM cable wire racks would not fit into the wiring closets in Sohio's building design. "And the cable is a space hog," requiring one-third of the horizontal distribution space allocated for wire in the building's design, Duncan said.

Finally, the large bend radius — related to the cable's flexibility — of IBM's type II cable makes its installation difficult, he said.

Notwithstanding these drawbacks, Sohio did decide to install the IBM Cabling System to supplement twisted-pair cable in those departments committed to IBM as a vendor. For example, the IBM cable is being used to connect IBM Personal Computers to IBM System/36 minicomputers.

Sohio required support for point-to-point asynchronous terminal-to-host communication, IBM 3270 and high-speed printer connection, departmental systems and video and other broadband services.

> *'We question how universal the cable will really be for non-IBM products.'*
>
> — Les Duncan
> Standard Oil Co. of Ohio

Three years ago, Sohio decided to meet its requirements with various devices. The company decided to use a digital PBX to connect terminals to 16 minicomputers with more than 600 ports. Sohio's equipment includes processors from Hewlett-Packard Co., Prime Computer, Inc., Digital Equipment Corp. and IBM.

The PBX provides three twisted-pair wires for every desk; one is for voice/data, and two are multipurpose. The cable connection summary of Sohio's headquarters is as follows: 3,000 twisted-pair connections, 300 IBM type I connections, 150 coaxial cable connections, 50 shielded twisted-pair connections and 32 fiber-optic connections.

A separate IBM 3270 network is used for departmental systems and special applications, Duncan said. A fiber-optic channel extender connects Sohio's headquarters to a nearby building housing host processors. For various video applications, the company uses a broadband local-area network backbone extending from the top to the bottom of the building, with limited horizontal distribution.

Duncan recommended adopting a cabling policy to manage resources. Sohio's cabling policy states that the digital PBX should be the primary data communications system for the building, that twisted-pair wiring is the primary data communications cabling and that departmental local-area networks should be installed where speed or connectivity dictate.

Duncan also stressed the importance of incorporating flexibility into a building's design. Sohio installed a cellular floor system, which Duncan described as having much of the flexibility of a raised floor but at a lower cost. The cellular floor paid off when Sohio acquired part of Gulf Oil Co. halfway through construction of its headquarters.

"We had a major reshuffling on 12 floors," Duncan said. "If we had installed conduit, we would have had significant rework. As it was, with the cellular floor, we rolled with the punches."

TEXAS from page 12

the MIS concentration is also reflected in the direction of undergraduate computer science education at the university. While not specifically gearing up to train candidates for the MIS program, the undergraduate program now stresses a much broader range of organizational skills on which future DP employees can base their careers.

Data processing/analysis and computer science majors, for example, are now required to take more writing and communications courses than they were previously.

"A much larger percentage of recruiters are looking for broad problem-solving skills, not just Cobol programmers," said Associate Professor of Information Systems Eleanor Jordan, an associate director of the MIS concentration. "They want the person who can handle business and organizational issues and can still deal with technical problems. I think they've seen enough people who can read assembly but can't communicate with people. We've had some graduates who have been asked to evaluate micro purchases for their businesses just one year out of college."

In this environment of changing corporate needs for DP management, the university hopes to supply valuable personnel resources. "The MIS program was actually proposed without the IBM grant," Klingman said. "It's a direction [in which] we've been heading for some time because we knew it was needed."

Wang exhibit scheduled for October

BOSTON — Access '85, the first exhibition of Wang Laboratories, Inc. and Wang-compatible products, will be held Oct. 1-3 at the Bayside Exposition Center here.

Exhibitors are expected to include vendors of applications and services that are available in the Wang marketplace.

Attendees will have the opportunity to compare and evaluate a variety of products from leading suppliers and manufacturers.

The exhibition is scheduled to run concurrently with the International Society of Wang Users Boston Conference.

Cost of the exhibition is $25.

More information on Access '85 is available from Data Base Publications, 11754 Jollyville Road, Austin, Texas 78759.

Report to eye minicomputers

Are superminicomputers crowding the mainframe market, and are supermicros encroaching on the minicomputer market? *Computerworld*'s Special Report on minicomputers and small business systems will address these and other issues in September.

Contributions are now being considered for publication and should take one of two forms: a tutorial article discussing an issue or a trend, or an application story outlining a user's experience. The deadline is July 30.

Articles must be typed, double-spaced and range in length from three to five pages.

Additional information is available from Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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ISN INTERNATIONAL SOFTWARE NETWORK, INC.

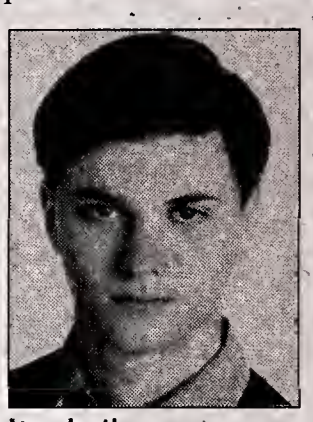
All-star teen hacker's team beat hundreds of systems

By Paul Korzeniowski
CW Staff

At 14, Bill Landreth was a major league hacker.

During a four-year career that began in 1979, he cracked between 90 and 100 corporate systems and was a member of a team that accessed approximately 800 computer systems. The team beat university, banking, insurance, newspaper and telephone company security systems. Landreth's exploits are the subject of *Out of the Inner Circle*, published by Microsoft Press, a division of Microsoft Corp. in Bellevue, Wash.

The career of Landreth, who became known as the "Cracker," began in the minor leagues. When he was a teenager, he and his parents split the cost of a $1,000 Tandy Corp. TRS-80 Model I Level II microcomputer. Once he had the machine, learning about computer systems became an adolescent obsession. First, he taught himself how to program in Basic; next he became fluent in Zilog, Inc. Z-80 microprocessor assembler language.


Landreth

To spur their son's interest, Landreth's parents purchased him an Apple Computer, Inc. Apple II. When Landreth borrowed a dumb terminal and a modem from a friend, his hacking moved out of his home and into computer networks.

With the new tools, he began to access a number of bulletin boards. Bulletin boards act as road maps for hackers. They include programming tips, public domain software and games. They also often include telephone numbers, account names and passwords to large computer systems. Such systems fascinated the Cracker, and he spent many nights and early mornings exploring them. "I was spending between $450 and $650 a month on telephone bills," he said. His parents sometimes questioned him, shook their heads and paid the bills.

Whenever the Cracker entered a large system, he tried and often succeeded in gaining operator-like authorization, information other hackers could use. Landreth started trading his information with other hackers.

Through such trading, he became a member of a team of elite hackers known as the "Inner Circle." Members of the group used a number of techniques to access a system and work their way up to the level of a system operator. Their techniques included entering random passwords, emulating a logon screen, manipulating computer memory, changing commands stored in a memory buffer, mimicking a system operator's terminal, locating programs to bypass security procedures and writing a program that a legitimate user might run, thereby unknowingly testing system security procedures.

Through these ruses, the Inner Circle gained access to approximately 800 systems. Landreth claimed the group did not damage any data. When it was learned that one member had altered data, he was blacklisted.

AT&T Unix easiest to access

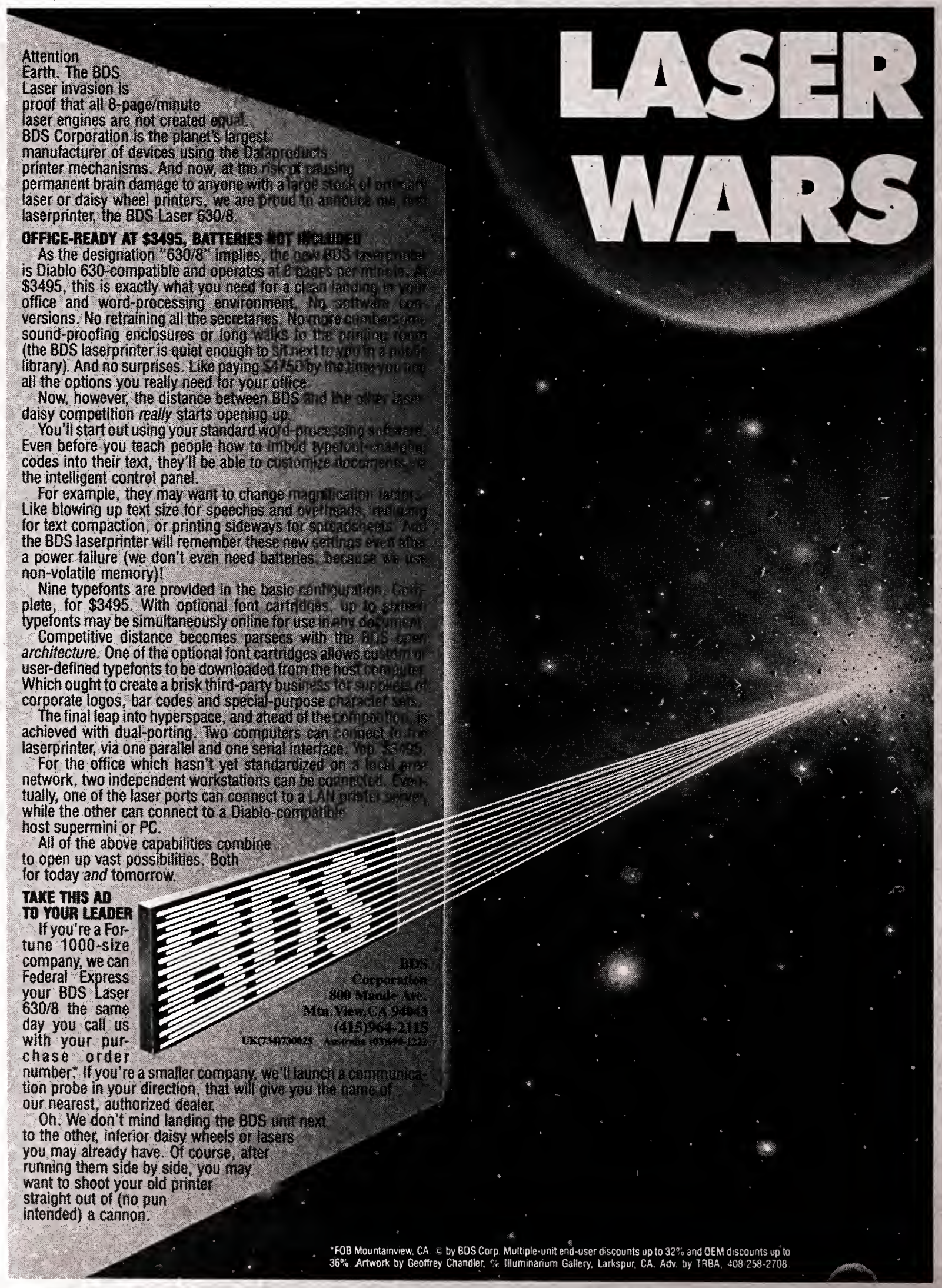
Some operating systems were easier to crack than others. The Cracker listed AT&T's Unix as the easiest operating system to access. Other operating systems that provided minimal security features, according to Landreth, were Digital Equipment Corp.'s Tops, RSTS and VMS. IBM's VM was one of the more difficult systems to crack. Prime Computer, Inc.'s Primos was once a hacker's dream, but the vendor strengthened its security features (see story page 1). Because hackers search for the easiest system to access, the group lost interest in Primos.

Universities are likely to have lax security, while banks tend to supply the most secure systems, according to the Cracker. Other than those two extremes, systems tend to defy classification. "There were some newspapers that had lax security and others that were quite secure," Landreth noted.

In the end, the Inner Circle became a victim of its own lack of security. The group accessed GTE Telenet Communications Corp.'s Telenet packet-switching network and set up a bulletin board. Inner Circle members thought they were not being observed and left a trail of clues that led to their arrests. One hacker member left his name and telephone number on the system; a second wrote GTE Telenet a letter and offered to solve the company's security problems.

In May 1984, the Cracker was indicted and charged with three counts of wire fraud. Through plea bargaining, Landreth was found guilty of one charge, fined $100 and given a sentence of 100 hours of community service.

Thus, the Cracker's career came to an end. "The judge realized that I may have a future in the computer field, so he let me keep an IBM [Personal Computer] and a modem," Landreth said.



Ex-hacker offers supplemental security checklist

In theory, every system is secure. In fact, every system has flaws. Flaws often are not apparent to an MIS manager and can be as simple as a user telling a friend a password.

Bill Landreth, a one-time hacker, estimated in his book *Out of the Inner Circle* that each month, up to 100 hackers attempt to crack a system with one dial-up line.

To prevent unauthorized access, Landreth recommended that companies supplement security measures.

He suggested that an encryption system works well with a good password system.

Landreth targeted three areas vulnerable to security breaches: telephone lines and modems, logon sequences and passwords.

TELEPHONE LINES AND MODEMS

■ Companies should try to eliminate telephone line access or at least try to limit incoming calls to only those from a local area code.

■ If a company must allow users to call in to a system, the company should move the main system off-line and let users access only a smaller front-end system.

■ Do not publish modem numbers.

■ From time to time, change modem numbers.

■ If possible, keep modem numbers on a three-number exchange that is different from the company's main number.

■ Have a modem ring two times before answering.

■ Have a telephone operator answer the line, and require that a user ask for the computer.

■ Change data lines to voice lines. Hackers have been known to search telephone company trash cans in search of data line lists.

■ Be certain the system disconnects users who hang up the phone without properly logging off.

LOGGING ON

■ Remove character storage memory buffers that store keystrokes from a logon phase.

■ Have the system disconnect a user who makes more than two unsuccessful attempts to access a system.

■ Have your modems disconnected if a user unsuccessfully attempts to access a system five to 10 times. A system operator can later reconnect the lines.

■ Flash a warning message such as "Invalid Account — Notifying System Operator" whenever someone is unable to access the system.

■ Limit the number of users for each account.

■ Have a user verify the last time he used his account.

■ Do not provide any information or power before a user is logged on. Help screens often provide a hacker with access to a system.

PASSWORDS

■ Do not support default passwords — a password given to all first-time users. Users are supposed to change the password the first time they use the system, but often they do not.

■ Use a random pattern when assigning passwords.

■ Do not assign long random passwords, since users will change them to something they can remember.

■ Have a system ask for a new password when a user logs on to a system for the first time.

■ Make sure that users know how to change their passwords, but do not allow them to change them to one-letter passwords.

HACKER from page 1

on a computer when it is first installed. The account is supposed to be deleted, but often it is not. Rather than being deleted, the account had been set to a privileged password.

"He changed information in a job queue and brought down the minicomputer," the security administrator noted.

The computer was running batch programs for a number of models used by geologists at the agency. Since the agency had backup tapes, no data was lost. However, the agency spent considerable time and money determining how the system was brought down. The culprit was never found.

Three other times the agency caught the hackers before they could damage the system. In one case, a college student accessed the network through a toll-free number.

In another, an adolescent tried to access the system through random dialing and random password techniques shown in the movie *War Games*. A second adolescent was given the system's modem number by a fellow hacker.

Response varied

The agency's response to its security problem has varied. One response has been to threaten the hackers with lawsuits. "Federal agents have informed the hackers that they could be prosecuted," Cecula said. "In some cases, the hackers did not know that they had accessed a mainframe."

The agency also has eliminated the toll-free number. "The hackers no longer are able to access the system at our expense," Cecula said. In addition, passwords have been reset or reassigned.

Because of the problems, Cecula's group wrote its own security package. "The package tracks the number of times someone tries to access a system," the security administrator noted. "Previously, there were no logs kept for the number of times access was attempted. Most packages track attempts made after someone has entered a system."

Forest Service incident

Last February, another government agency, the U.S. Department of Agriculture's Forest Service, caught a hacker accessing its Data General Corp. MV/4000 superminicomputer.

Lynn Vancil, assistant director of information systems at the Lake Wood, Colo., office of the Forest Service, reported that a Los Angeles system operator learned the company's identification and password to GTE Telenet Communications Corp.'s Telenet service from a bulletin board service.

"The hacker was familiar with our computer's operating system since he used the same type at work," Vancil said. "He built himself a user profile."

The hacker's access triggered GTE's security system, which noted the unusual 3 a.m. hour of access. The vendor notified the government agency of a possible problem. For a month, GTE, the Federal Bureau of Investigation and the Forest Service monitored the activity, tracing it to the hacker's home.

In March, Philip Gonzalez Fadriquela was arrested and charged with six crimes.

Fadriquela had not damaged any data. "He seemed more interested in experimenting with the system than in destroying any data," Vancil noted.

Following plea bargaining, the hacker pleaded guilty to three misdemeanors for wire fraud, and in return, the government dropped three felony charges. Fadriquela was sentenced to three years of probation, fined $1,000 for each misdemeanor and sentenced to 200 hours of community work, according to Cathy Goodwin, assistant to the U.S. attorney.

"The fine would have been higher — it carries a maximum of $5,000 — but the judge did not think that the defendent would be able to pay more," she said.

Goodwin estimated that tracking the unauthorized access cost the Forest Service at least $50,000, but the actual figure is probably closer to $100,000. "Since it cost the agency so much money, the judge wanted to make sure that he sent a message to other hackers," she said.

The Forest Service has taken a few preliminary steps to strengthen its security. "We changed all of our passwords to a random series of numbers and letters," Vancil said.

"The break-in has turned out to be a learning experience for us," he added.

Computerworld *senior writer John Desmond contributed to this report.*

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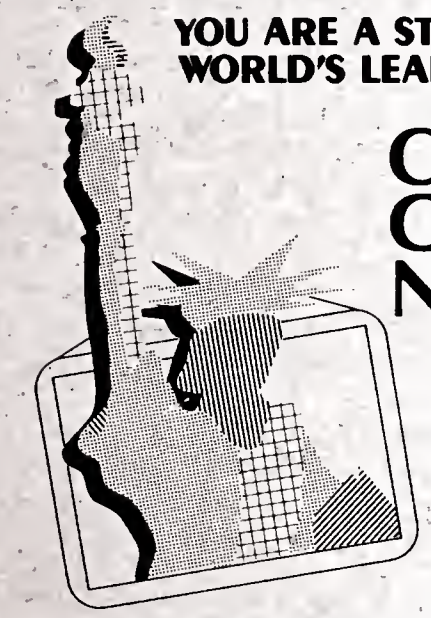

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Multimate to extend software to larger IBM systems

System/36 tool expected in '86

By Eric Bender
CW Staff

EAST HARTFORD, Conn. — Moving to meet the challenge posed by IBM's Displaywrite word processing software, Multimate International Corp. will port its Multimate personal computer software to larger IBM machines, aiming to ship versions for the System/36 and various mainframes running under IBM's VM/CMS and MVS/TSO by first-quarter 1986.

Multimate, which industry "hot lists" show as the best-selling word processing package for the IBM Personal Computer and which has made a particularly strong showing in Fortune 1,000 firms, received increased competition after IBM announced plans for Displaywrite/36 and Displaywrite/370 packages last October, company President Wilton Jones said.

Among corporate customers, "we began losing ground a bit when IBM came in and said [Displaywrite] will work on everything," Jones explained, emphasizing that corporations do not want to be forced to retrain employees for word processing on different machines.

One reason Multimate became the first major player in the microcomputer applications software arena to broaden its offerings to larger IBM systems is that among applications software, "word processing is the first generic product that IBM has taken seriously," he claimed.

Cost of the System/36 Multimate software will range from $1,800 to $2,200 per CPU, depending on how many add-on capabilities are supplied, Jones said. Mainframe package prices will be based on the number of terminals, ranging from $15,000 for an IBM 4331 to $30,000 for systems such as the 3083.

Wang-like style

Running on the larger IBM systems, the software packages, based on Multimate's new high-end Advantage micro software, will preserve the micro version's Wang Laboratories, Inc.-like style and conform to IBM standards such as Document Content Architecture, Jones said.

"In a Profs [IBM Professional Office System] VM environment, a user would see Multimate as one of the main menu items under Profs," he noted. "It would not replace Profs utilities or functions; it would add one editor."

Some functions, such as text centering, would be modified to conform more closely to standard IBM functions, he added.

The System/36 software, which will resemble current personal computer software more closely than will the mainframe packages, will run on all System/36 models. Like the mainframe versions, it will work with IBM's Personal Services software, Jones said.

Additionally, Multimate reportedly plans to guard its flanks in small to medium-size businesses by offering packages for several popular minicomputers. Based on the Multimate Just Write software, the packages will be available for $2,000 or less in first-quarter 1986.

While industry analysts generally approved of the company's plan, some noted that many Multimate customers bought the software to complement their existing Wang word processing equipment and do not plan to install significant numbers of System/36 machines.

Expansion a challenge

The rapid expansion of its product line represents a large challenge for Multimate, which posted sales of $22 million in the fiscal year ended in March and expects to see $30 million to $36 million in sales this fiscal year, Jones noted. In a well-publicized vote late last month, company employees approved the overall plan.

Multimate currently employs about 210 people. The word processing development staff numbers about 65, and the company expects to boost this quickly to approximately 110, Jones said.

This kind of sudden expansion in personnel brings "tremendous culture shock," Jones acknowledged, but he maintained that the shock is less than in the case of continual growth.

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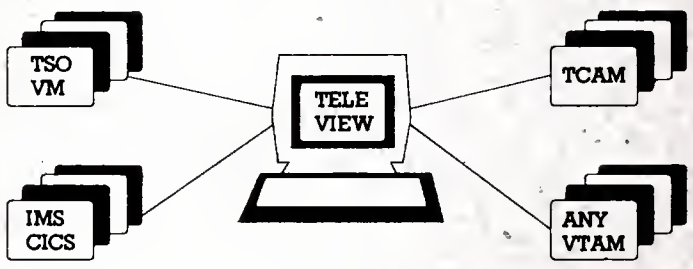

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SECURITY from page 1

hacker. "Whenever someone can't access a system after three tries, the operating system will disengage the user," Damon said. The system operator has the option to design a system so that it disconnects a user or makes it appear like the hacker is getting into the system even though he is not, he explained. "A security administrator can monitor the line and trace the phone call," he added.

Security easy to crack

Passwords and account numbers are designed to provide a wall of security. That wall has proven to be easy to crack.

A few years ago, customers of GTE Telenet Communications Corp.'s Telenet network were able to set up universal accounts for first-time users. There were cases where customers set the accounts with a simple password, often only one letter. Experienced hackers can easily crack such a system.

"We changed the system so that it would require passwords of at least six alphanumeric characters," said Claudia Houston, a spokesman for GTE.

Other changes that vendors are making include additional lines of security. Rather than requiring one account and a password for everything, some operating systems require that a user first log on to the operating system. Only after that is completed can one access a specific application.

When a hacker cracks an account, he can use various programming tricks to search for accounts and passwords that will provide him with more ability to manipulate the system. He can write a routine that looks into main memory and checks lists of other accounts and passwords.

"We have a feature that partitions memory so that a user can look only at the portion where his application lies," noted David Habermehl, product marketing manager for Primos, Prime Computer, Inc.'s operating system.

Passwords stroed in encrypted data

AT&T has enhanced its Unix operating systems so that passwords are stored in encrypted data. Even if the hacker could look at the data, it would not make any sense to him, AT&T claimed.

In Release 7 of the CPF operating system that runs on IBM's System/38, a security feature that prevents passwords from being intercepted over communications lines was included, a spokesman said. The software will not accept a password that is sent alone over a line; a password must be paired with code authorizing the user on the system.

Despite all the enhancements, system security is only as good as each company makes it. "We found that some companies had security measures that did not take full advantage of our system's security features," Prime's Habermehl said.

Niceco to hold September strategy meet

STONE MOUNTAIN, Ga. — The National Information Center and End-User Computing Organization (Niceco) will hold its Strategy Conference Sept. 17-19 at the Atlanta Hyatt Regency Hotel.

Shaku Atre, a consultant specializing in information center strategies, will give the keynote address. Other topics will include data control, micro-mainframe links, security and information center policy guidelines. The conference is sponsored by D&B Computing Services in conjunction with the Data Processing Application Consultants group.

Registration costs $375 before July 31, $475 thereafter. Niceco is located at 785 Martin Road, Stone Mountain, Ga. 30088.

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☐	☐	Do you have a "Born to Code" tattoo on your arm?*
☐	☐	Have you ever programmed for 24 hours straight just for the fun of it?
☐	☐	When you talk to IBM, do you tell THEM how the system works?
☐	☐	Do you still remember the bugs you shot 10 years ago?
☐	☐	Do you discuss channel programming at parties?

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Long-distance cost savings key to Fortune 1,000 market

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — Users in Fortune 1,000 firms will reap cost benefits as long-distance carriers increasingly offer enhancements to their services.

So said Dixon R. Doll, president of the DMW Group, Inc., a telecommunications consulting firm based in Ann Arbor, Mich.

Addressing a seminar at the Competitive Telecommunications Association (Comtel) conference in San Francisco recently, Doll told the carriers that cost savings are the key to penetrating the untapped Fortune 1,000 market.

"If you let the corporate client know more about his long-distance usage patterns than he already knows and give him ways to save money, you've got a foot in the corporate door," Doll said. "In the Fortune 1,000, information equals power," he said.

Doll suggested a variety of ways carriers could help corporate users reduce their bills:

■ Optimizing network services. Most Fortune 1,000 companies are not using effectively their long-distance networks, Doll said. However, recently developed software lets users project their future network usage needs and allows carriers to reallocate their excess networking capacity. This can result in a 5% to 7% cost savings, Doll said.

■ Using emerging technologies. Speech compression, for example, will double the number of channels available to users without increasing their monthly circuit costs, Doll said.

■ Offering long-distance services bundled with related data communications services to the shared-tenant market.

■ Packaging private branch exchange rentals with long-distance service.

As carriers attempt to differentiate their long-distance services, they will offer other product enhancements during the next several years, Doll said.

These will include electronic document distribution services, which let users move pages through a network; nationwide paging services; and voice mail service bureaus, Doll said.

Doll warned the group that the recent trend in the Fortune 1,000 to install high-speed T1 networks and equipment is a double-edged sword.

On the positive side, Doll said, the use of this high-speed equipment creates more usable capacity. On the negative side, however, corporations will increasingly resell this excess capacity and compete directly with the carriers themselves, Doll said.

Eastman Kodak Co. in Rochester, N.Y., and Sears Roebuck & Co. in Chicago have already begun doing this, he said.

Irug conference set for July 17

CHICAGO — The Irmx User Group (Irug) is scheduled to hold its international users conference at the Palmer House Hotel here July 17.

Irmx is a real-time operating system that was developed by Intel Corp. in 1980. The theme of this year's conference is "The Future Direction of Real-Time Software Applications."

At the conference, Intel's Irmx 286 and Opennet, its Ethernet local-area network, will be discussed.

A demonstration room will enable attendees to test Irmx products from Intel and independent software vendors.

There is no charge for attending the conference.

Additional information can be obtained from Catherine Moon, Irug Coordinator, Mail Stop HF2-57, 5200 N.E. Elam Young Pkwy., Hillsboro, Ore. 97123.

Software/Expo speaker chosen

DALLAS — Thomas M. Nies, chief executive officer of Cincom Systems, Inc., will deliver the keynote address at the 1985 Software/Expo to be held here Sept. 17-19.

Nies, whose firm has a reported 6,000 customers worldwide, will speak on "The 'Musts' for Modern Systems Implementation." Other presentations set for the conference include a panel discussion on software systems for business graphics and an examination of the problems posed by artificial intelligence to MIS professionals.

The conference is sponsored by *Infosystems* magazine. Registration for the show only is free when accompanied by a form obtained in advance from the conference organizers, Software/Expo. Otherwise, show-only registration is $10. Registration for the conference and the show costs $325 for the entire event and $110 for one-day attendance.

Software/Expo's offices are located in Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

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NEWS

Study: N.Y.-area computer execs' salaries rose 20% in '84

By Clinton Wilder
CW Staff

NEW YORK — The salaries of top computer executives jumped by 20% in 1984, and the decentralization of data centers created many more software management jobs in large corporations, according to a recent survey of information management and data processing executive jobs in 28 large companies in the New York area.

The survey was the third annual salary study conducted by New York-based Edward Perlin Associates, Inc. The results showed only a 5% to 6% increase in the average total compensation (including stock options and deferred salary) of systems software department heads and software managers — a fact that research firm President Edward Perlin attributed to staff growth.

According to Perlin, the addition of many new management positions in decentralized data processing operations diluted the average salary figures when compared with the prior year. "What struck me most about the survey was that salaries didn't move more," he said.

"But we found that if a manager earning $60,000 [a year] got a raise to $70,000 but was joined in management by a $50,000 [a year] employee, the average salary in the department remained the same. There are a lot more people moving up the ranks into quasi-executive positions," he said.

Perlin's survey tracked 23 top computer executive positions, with area head — which refers to the company's top computer executive — the highest paid position and head of systems architecture and resource management the lowest paid positions.

Most of the firms surveyed were leading New York-based service companies — 11 were in banking, nine were in financial services, and two were in insurance.

Average salary increased

The average area head salary jumped from $183,500 a year in January 1984 to $221,600 one year later. An area head position is typically at the level of vice-president, executive vice-president or senior vice-president.

Perlin said the top job produces some of the survey's most accurate statistics because the turnover rate in those positions is so low. "With area heads, we're basically surveying the same guy year to year," he said.

The annual salaries for 19 area head positions surveyed this year ranged from $99,300 to $550,000, with the top salary showing a dramatic increase from $357,000, the highest salary reported among 27 area heads in 1984.

The decentralization of data centers among the surveyed firms shows up dramatically in the job classification of data center head. With 27 companies reporting in each year, the number of data center heads jumped 56% from 48 in 1984 to 75. But the average salary dropped from $73,500 to $73,000.

"We know that there are a number of facilities out there for many of the major companies," Perlin said. "Citicorp has 12 different DP centers, and we see the same trend with Chase Manhattan Bank and [Manufacturers Hanover Trust Co.]; what used to be centralized facilities now are spread out among half a dozen. In the three years of the survey, I can't think of one company that's gone the other way [to a more centralized DP operation]."

Figures evidencing staff growth

Other figures that evidence staff expansion include 20 companies reporting 63 salaries for manager of network operations jobs in 1985, compared with 16 firms reporting just 19 such positions in 1984. Systems design and development also showed marked growth in positions. The number of group heads reported for that department rose 25% from 60 in 1984 to 75 positions, with one fewer company reporting in 1985. Twenty-five companies reported 241 heads of systems design and development in 1985 — a 20.5% increase from 200 the previous year.

Among positions with comparable numbers of jobs reported in each year, the Perlin study found the following salary increases:

- Group head, computer services: Up 6% from $103,200 to $109,500.
- Telecommunications services head: Up 6% from $77,900 to $82,700.
- Manager, domestic communications networks: Up 15% from $56,600 to $65,000.
- Head, office automation: Up 9.5% from $64,000 to $70,100.

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Start Date (ddmmmyy): 01jul85

Holidays (ddmmmyy): 04jul85

	Activity	Duration	Tail	Head	Target
1	Drill Well	4	1	2	.
2	Build Pump House	3	2	5	.
3	Install Pipe	2	5	7	10jul85
4	Construct Power Line	3	1	5	07jul85
5	Excavate	5	1	4	09jul85
6	Install Pump	6	4	7	.
7	Deliver Material	2	1	3	.
8	Assemble Tank	4	3	6	.
9	Erect Tower	6	6	7	.
10	Pour Foundation	4			

Schedule for Well No. 121-005

JOB	ACTIVITY
1	DRILL WELL
2	CONSTRUCT POWER LINE
3	EXCAVATE
4	DELIVER MATERIAL
5	ASSEMBLE TANK
6	BUILD PUMP HOUSE
7	INSTALL PUMP
8	POUR FOUNDATION
9	INSTALL PIPE
10	ERECT TOWER

JUL 01 JUL 04 JUL 07 JUL 10 JUL 13 JUL 16

LEGEND:
- DURATION OF A NORMAL JOB
- SLACK TIME FOR A NORMAL JOB
- DURATION OF A CRITICAL JOB
- BREAK DUE TO HOLIDAY
- TARGET

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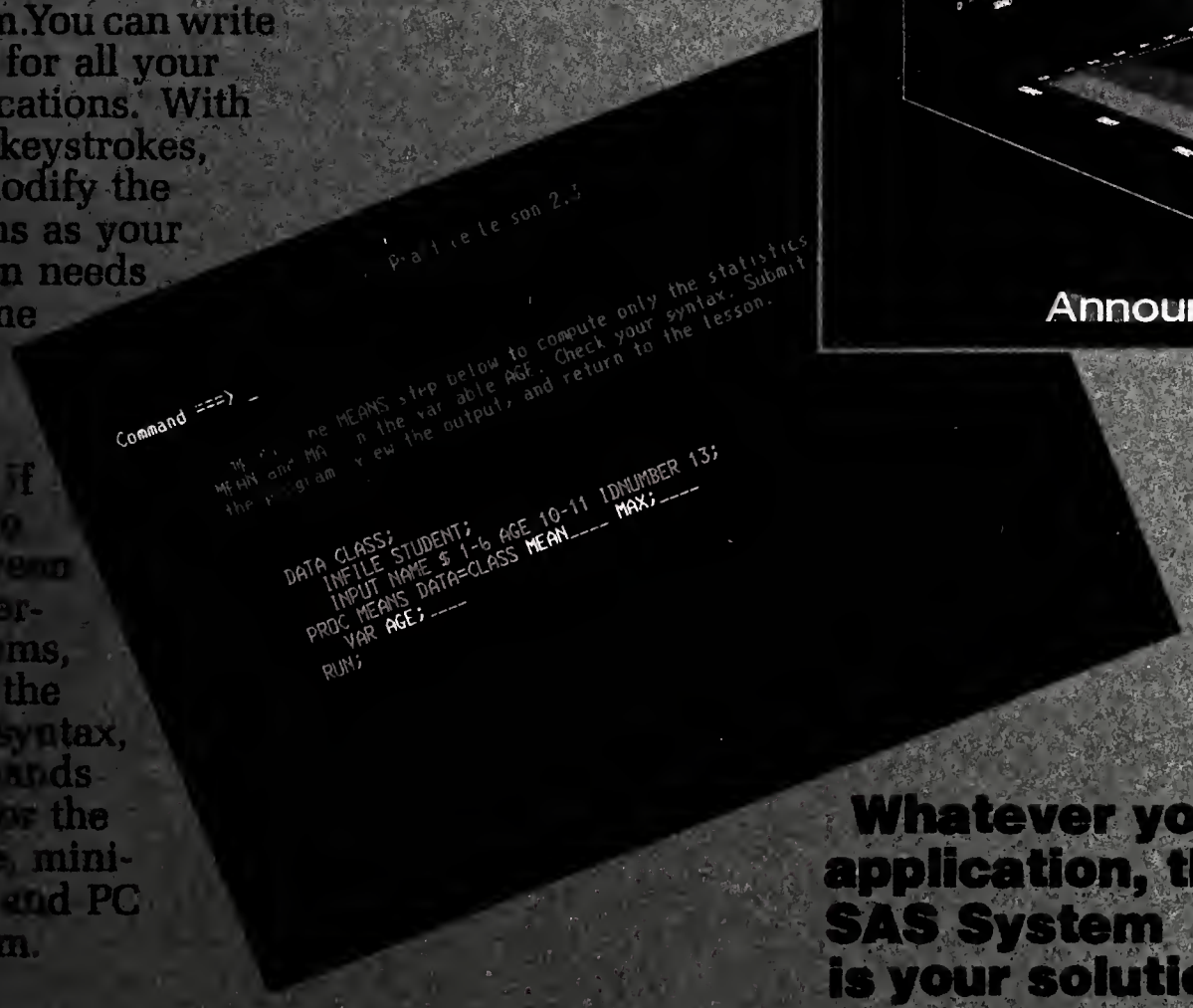

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MRP pipeline helps firm cut lead time, inventory

BRADFORD, Pa. — In less than one year after it installed a software system, a Fortune 200 company's manufacturing division here cut its lead times in half and its inventory levels by a third and gained a number of other substantial benefits.

The manufacturing division of Dallas-based Dresser Industries, Inc. employs about 250 workers who manufacture products for the energy industry that include pipe couplings, pipe valves and pipe fittings.

When the division began considering automation in 1979, its methods were out of date and inaccurate. The firm used predominantly manual systems; only 20% of its products in inventory had part numbers, and its on-time delivery rate was only 30%.

Inventory up, accuracy down

Dresser set up a task force to make an assessment of the division's operations and pull it out of its rut. "Inventory was way up, and accuracy was terrible," said Rene Al, Dresser's vice-president of operations and head of the task force. "On-time delivery was worse. And we discovered the existence of 13 different bills of material for the same product. You can imagine the confusion that caused."

Without a common bill of materials that reflected the most current and accurate design information from Dresser's engineers, the firm had no way to guarantee that the materials production needed were the same ones the division's purchasing department was ordering.

The task force decided Dresser needed to implement a material requirements planning (MRP) software system. Under the direction of a new task force, the firm bought three modules of Management Science America, Inc.'s Manufacturing System — manufacturing standards, inventory record control and product costing — and installed them on a 24M-byte Amdahl Corp. 5860 in Dallas.

Dresser started bringing up the software in July 1982. "At the time, we were in an economy that was heading in the wrong direction," said James Yerdon, manager of materials management. "But management said, 'We'll endure the expense in the short term for gains over the long haul.' "

From the beginning, the software project helped Dresser hone its operations. During the installation, for example, the firm instituted an alphanumeric indentification system for inventory parts and reviewed its old parts list. After the review, 30,000 inactive parts numbers were eliminated.

Within a year after the installation, the division's productivity rose by 25%, and its on-time delivery improved by 65%. On-time delivery is now at 70%, and the division expects to reach on-time percentages in the high 90s within the next year.

According to Thomas Wilson, the second task force's team leader, the software module that provided the basis for many of the benefits was MSA's standards module, which ties together costing and scheduling functions. The module contains Dresser's bill of materials, standard routing, work center definitions, engineering change notices and an item master. The item master, which pegs each part of each manufactured product from raw material to finished product, was particularly beneficial, Yerdon said.

Another improvement the system brought was in operations engineering, the department responsible for developing routings between work centers. According to Lynn Allen, a product processor who designs routings, the software cut development time in half.

Allen said that with the system taking care of development tasks, product processors can be dedicated to more important work. "Instead of spending most of our time as clerks we can get more involved in solving problems on the shop floor [and] investigating better methods for doing things," he said.

Another important trend that emerged was a shift in Dresser's make-to-stock:make-to-order ratio. With increased control over inventory and production, Al said, Dresser has seen a slight but important reduction in its volume of make-to-stock work in favor of an increase in make-to-order business.

Continuing trend

By being able to process orders quickly, Dresser expects to continue this trend, which will reduce the level of finished goods inventory and therefore reduce the amount of capital tied up in material. Wilson said the manufacturing division has already shaved about $13 million from its inventory and within a month will have only 35% of its capital devoted to material.

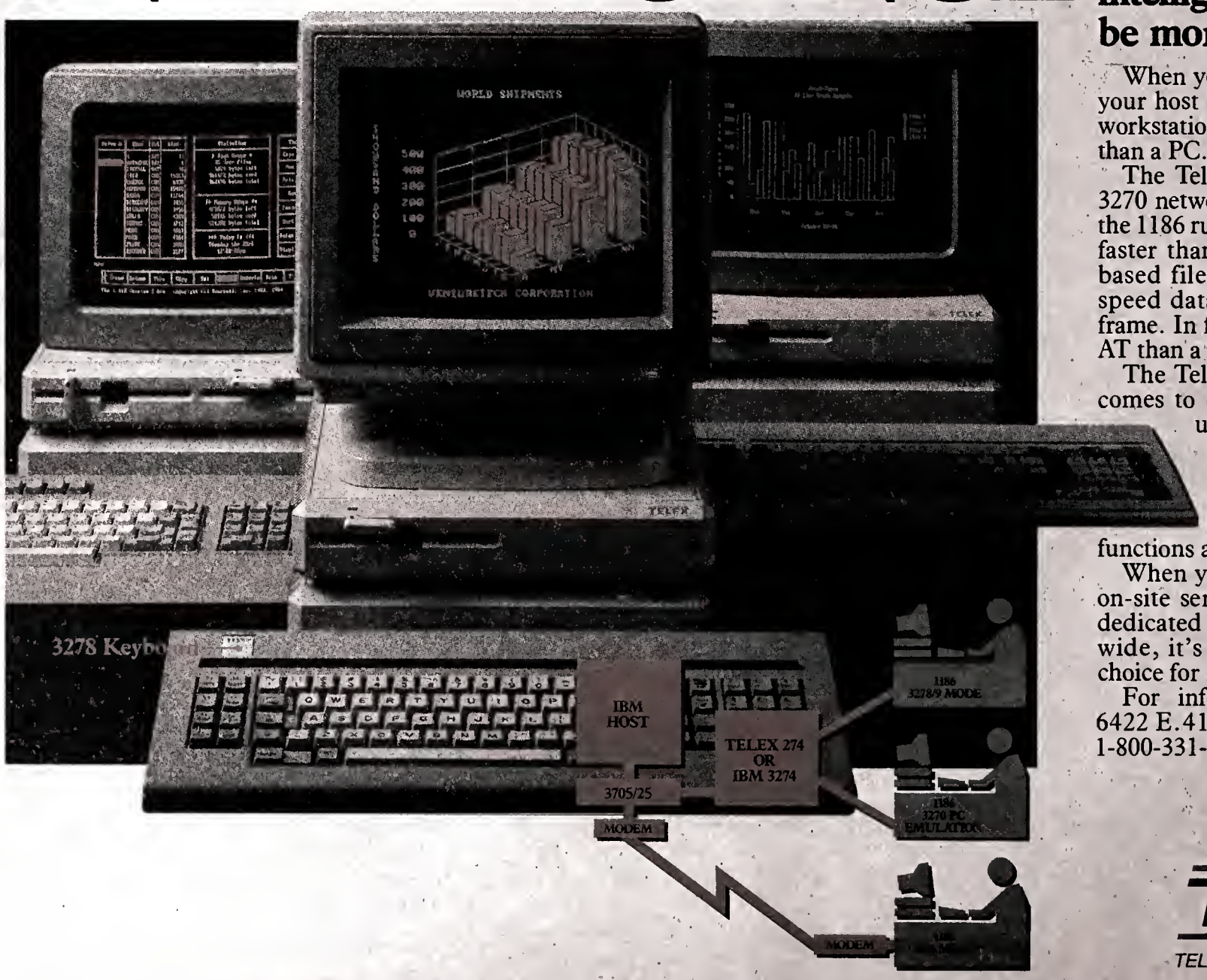
He said the software has also improved Dresser's customer relations, both by improving delivery times and by allowing sales staff members to make immediate inquiries about when customers request information. As a result, Dresser has booked orders that it once lost to its competitors.

With the old system, customers sometimes had to wait days or weeks for information such as production and shipping schedules. As a rough gauge of the system's success, however, Wilson said customers have complimented Dresser on its ability to respond quickly to their requests.

On average, users make 6,000 inquiries to the system each day. Wilson said the inquiries come from every division in the manufacturing division.

In the next few months, Dresser plans to bring up two additional MSA software modules — master production scheduling and manufacturing resources planning.

INTELLIGENCE



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NEWS

WORLD DIGEST
CW International News Network

TOKYO — Fujitsu Ltd. here has introduced a third line of disk drives to rival IBM's 3380 disk drives. Fujitsu reportedly announced two models of large-capacity magnetic disk storage — one with 5.04G bytes of storage capacity and one with an expandable 2.52G-byte capacity.

Fujitsu follows Hitachi Ltd. and the financially troubled Storage Technology Corp. to this market.

The devices are available for monthly lease prices ranging from $1,720 to $3,580, according to the vendor.

BLACKBURN, Australia — Employees of Hewlett-Packard Australia Ltd. here will be asked to follow their U.S. counterparts and take a three-day holiday this month to use up accumulated vacation time by August. A spokesman said HP was not considering layoffs because it expects an economic recovery to begin in the fourth quarter.

BRUSSELS — What is being called the contract of the century has been awarded to ITT subsidiary Bell Telephone in Antwerp, Belgium, and Acec of Charleroi, Belgium. The $2 billion contract calls for Belgium to digitize its telephone networks. Other bidders for the contract included GTE-Atea, Siemens AG, the AT&T and N. V. Philips joint venture and the Swedish communications giant, L. M. Ericsson.

PARIS — Seventeen largely European high-tech manufacturers will join forces to develop an open architecture intended for industrial applications.

Called Open System Architecture (OSA), the system is the equivalent of Open Systems Interconnect, the model of the International Standards Organization.

The companies engaged in this development include Groupe Bull, IBM GmbH, Cap Sogeti, AEG Telefunken, Aerospatiale, Philips Telecommunications, British Aerospace, CGE and Siemens AG. Industry sources see this project as one aimed at General Motors Corp.'s Manufacturing Automation Protocol project.

TOKYO — Approximately 61% of Japan's leading companies have no computer security devices at all, according to the Metropolitan Police Department's recent survey. The police department surveyed the 1,451 companies listed on the Tokyo Stock Exchange and received 1,151 responses. In the survey, 62% of the respondents indicated that DP people can enter and leave corporate computer rooms without any identification or security check. In addition, 37% of the respondents said employees besides DP people can also access computer rooms without identification.

Widely used security procedures here include employee signatures and identification cards that unlock doors (20%), alarm systems (14%), television monitors (10%) and devices that record entrance and exit (6%).

To safeguard software programs, 21% surveyed claimed to have a backup plan for operating systems software, while 18% had contingency plans for applications programs. Approximately 46% said they had no specific protection plan.

RIJSWIJK, Netherlands — Control Data Corp. (CDC) has reorganized its Benelux operations, merging Control Data Belgium and Control Data BV here in the Netherlands. All Benelux operations are now reporting to Control Data BV here.

The reorganization follows similar CDC mergers, combining subsidiaries in Sweden and Finland and in Switzerland and Austria.

OSLO — Unlike American minicomputer makers, Norway's largest computer vendor is experiencing record sales, according to Roy Jensen, general manager of Norsk Data A/S domestic operations. Sales are expected to top $227 million, compared with last year's $155 million. Norsk's ND-500 series accounts for about 70% of the firm's revenue.

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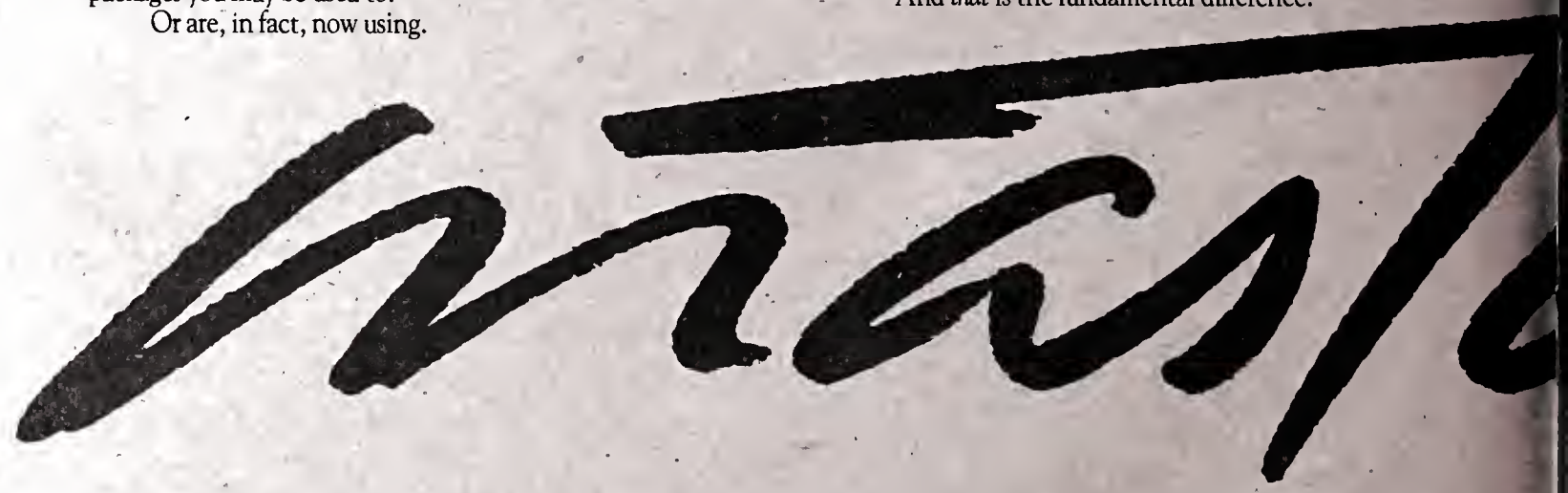

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CALENDAR

WEEK OF AUG. 4

AUGUST 4-9, DALLAS — **Systems Development: Analysis Phase.** Contact: Arthur Young & Co., Education Center, 1950 Roland Clarke Place, Reston, Va. 22091.

AUGUST 5-6, MINNEAPOLIS — **Unix/Xenix.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

AUGUST 5-7, PARSIPPANY, N.J. — **TSO/ISPF.** Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

AUGUST 5-7, JACKSON HOLE, WYO. — **EDP Audit Managers Roundup.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

AUGUST 5-7, BOSTON — **1985 American Society of Mechanical Engineers (ASME) International Computers in Engineering Conference and Exhibition.** Contact: ASME, 345 E. 47th St., New York, N.Y. 10017.

AUGUST 5-7, WHITE PLAINS, N.Y. — **The IBM Personal Computer.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

AUGUST 5-8, CHICAGO — **Vtam: From Start to Finish.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 5-8, HOT SPRINGS, ARK. — **The Seventeenth Annual Meeting of the National Association for State Information Systems (Nasis).** Contact: Nasis, P.O. Box 11910, Lexington, Ky. 40578.

AUGUST 5-8, FORT LEE, N.J. — **CICS/VS Application Design.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 5-8, WASHINGTON, D.C. — **Vsam: Its Structure and How to Use It.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 5-8, FORT LEE, N.J. — **CICS/VS Logic and Debugging.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 5-9, NEW YORK — **Basic Systems Analysis.** Contact: Thomas J. Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

AUGUST 5-9, NEW YORK — **Structured Analysis and Design Techniques Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

AUGUST 5-9, SAN ANTONIO — **CICS/VS Application Programming — Command-Level.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 5-9, ATLANTA — **Data Base Development Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

AUGUST 5-9, MILWAUKEE — **How to Plan for Factory Automation.** Contact: University of Wisconsin Extension, Center for Continuing Engineering Education, Civic Center Campus, 929 N. Sixth St., Milwaukee, Wis. 53203.

AUGUST 7-8, ATLANTA — **Recovery/Restart.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 7-9, LONG ISLAND, N.Y. — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry Street, Santa Ana, Calif. 92705.

AUGUST 7-9, RALEIGH, N.C. — **Local-Area Networks.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

AUGUST 7-9, PALO ALTO, CALIF. — **PBX/CBX.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Cailf. 92705.

AUGUST 10-12, TORONTO — **Data Base: Technical Developments.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

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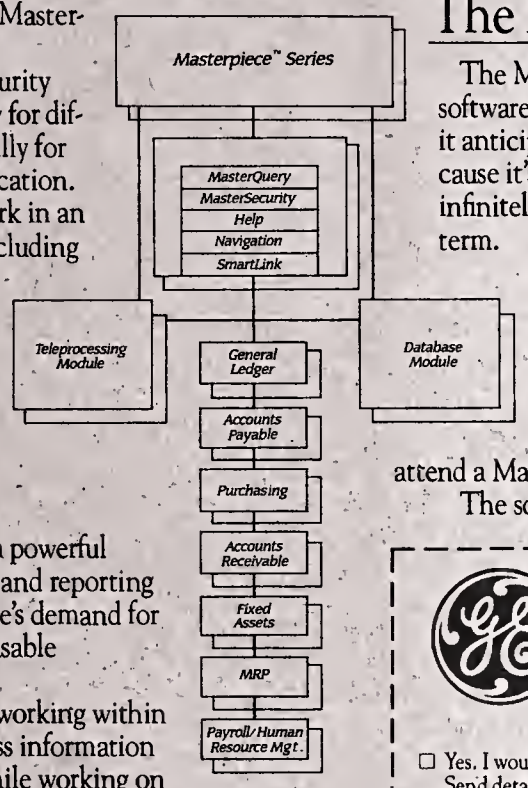

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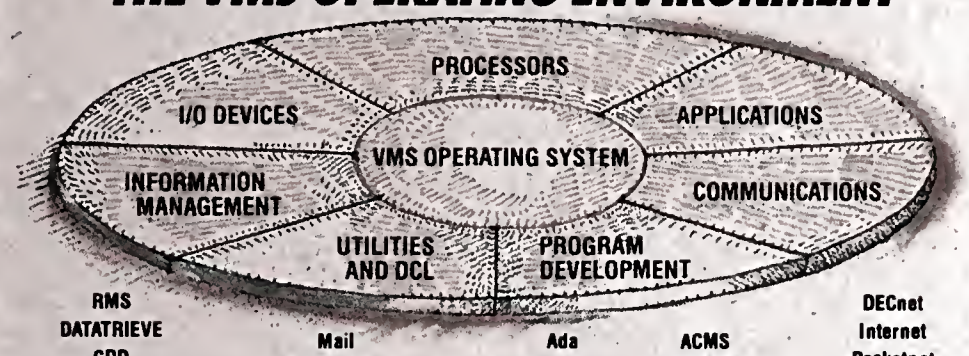

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EDITORIAL

Write your congressman

It almost goes without saying that programmers, no matter how well trained and how deeply motivated, cannot perform to their potential without the right tools. Similarly, it appears that a growing number of federal prosecutors are feeling hamstrung in the execution of their duties by the vagueness of laws pertaining to computer crimes [CW, July 1].

On the one hand, it can be weakly argued that we are lucky to have any federal computer crime legislation at all and that the Computer Fraud and Abuse Act of 1984 is a good start toward a more complete law. But this type of thinking ignores the realities of the modern technological state, in which the security of data bases that contain highly sensitive information is not keeping pace with the abilities of crooks who want to break into them.

To understand the scope of the problem, one need only look at the data on computer crime. The most significant aspect of the data is that most of the computer crime within the private sector is not reported intentionally to preserve the public's trust.

Moreover, the dollar value of many illegal computer entries cannot be accurately gauged. That is, what is the dollar value of damage done when secret *information* is accessed? Who is willing or able to judge the extent of long-term harm done by such an intrusion?

To understand further the need for comprehensive computer crime laws, MIS people and others must fully recognize that breaking into almost any system can be a fairly simple task today. This week, *Computerworld* examines hacking — often considered a more benign form of illegal system entry — and reports disturbing findings (see stories beginning on page 1).

One of the more notable hackers, now a consultant and author on hacking, admitted to recreational breaks into nearly 100 corporate computer systems. He was also part of a team claiming to have broken into hundreds more — all for the fun of it.

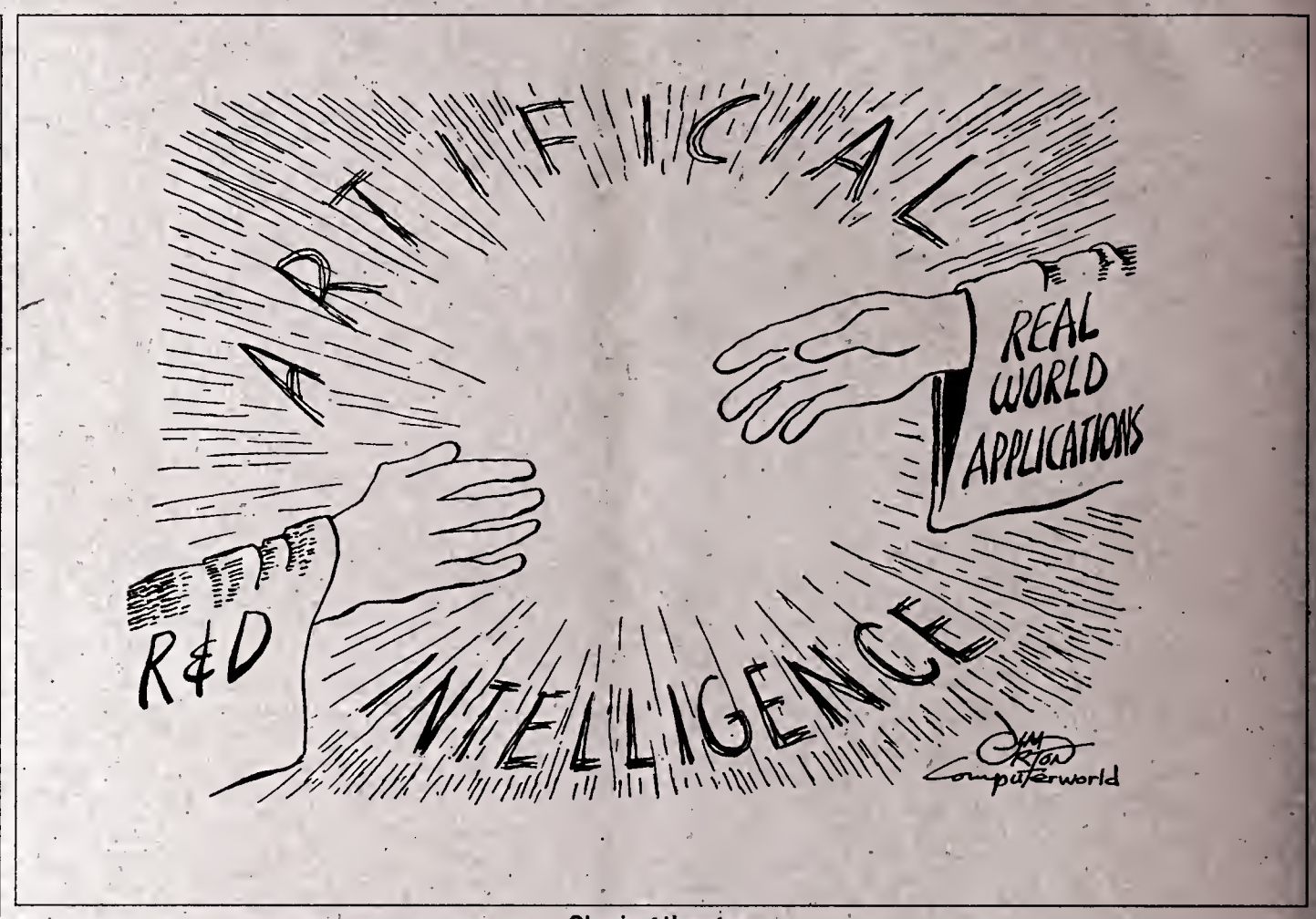
Couple that sort of fun and games with breaks of more malicious intent [CW, July 1], and the more prudent MIS managers must conclude that just about any system can and will be accessed illicitly.

That leaves one viable means of combating the problem in the short term, and that is stiffer, enforceable laws prohibiting it. It is not the fear of getting caught, per se, that deters people from cheating on their taxes, but the fear of the government penalties when cheaters are caught. It should be the same for illegal entries into systems.

There is potentially much more at stake in the latter case, both to individuals and corporations. Why, then, don't we have clearer statutes relating to computer crime?

According to some prosecutors, the current federal law is an easy target for sharp defense attorneys. It is confining and ill-defined and may result more in plea-bargained punishments than in the full application of the law, the prosecutors contend.

Whether acting through their companies, professional organizations or individual initiative, MIS managers need to play a lead role in a lobbying effort to put more teeth into computer crime legislation. Now is as good a time as any, as a U.S. House Subcommittee on Crime is mulling a modified computer crime bill that would extend the arm of federal prosecution into illegal access of private sector computer, not covered under federal law. As the saying goes, "Write your congressman."



Closing the gap

LETTERS

Shared tenant services here to stay

I'm writing not so much to congratulate you on your treatment but to respond to the information that was developed in the article, "Demand low for smart buildings" [CW, June 17]. The market for shared tenant services is not dead, not dying and shouldn't be going away soon. It's here to stay.

Why will shared tenant services live a long and healthy life? Because it's driven by simple economics. A small firm with 50 telephones or fewer cannot afford to spend even the $30,000 required to purchase a decent, integrated voice-mail machine. A provider of shared tenant services, however, can purchase a bigger machine with even greater capabilities for that mid-size tenant to use. And it will prove to be less expensive than trying to buy a cheap, inferior system.

If the offering doesn't catch on, it's the fault of the marketers for not seizing an opportunity. It could also be the fault of many of the companies that have developed and installed these systems; their design and comprehension of what the total offering could be leaves much to be desired.

And last, if the service does not make it, its demise could be linked to naive analysts who perform skimpy surveys, obtain negative results and, subsequently, have the results published by reputable journals. Such articles might be the most damaging vehicles as far as the industry observers, analysts and gurus are concerned. Fortunately, though, developers don't read those journals.

George R. Moskoff
Geneva, Ill.

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VIEWPOINT

Obtrusiveness in the age of automation

HUMAN CONNECTION
Jack Stone

The telephone rang last week, and the caller said, "Do not hang up, I am a computer. If you give me 30 seconds of your time, I will tell you how you can obtain a free oil change."

Click. I would have banged the handset down earlier when the word "computer" was mentioned, but I was paralyzed by surprise. Although this is an exaggerated, but true, example, it is certainly a dynamic case of how a computer system can intrude into one's personal life — and become thoroughly obtrusive.

There are similar situations in business, when the omnipresence of the computer interferes with a user's ability to adapt to systems operations.

One complaint about systems that I frequently hear is the continuing need for many users to focus on internal functionality rather than on the systems' uses. Obtrusiveness is related to the well-known systems characteristics and their ease of learning and operational simplicity. But it extends into the broader realm of how users relate to other, more established technologies in their everyday life, such as televisions and cars.

The following are comments from students after they reach the higher plane of amateurism:

"The terminal keyboard is a lot easier to use than I had previously thought, but I am disappointed that the systems are not as neatly packaged as I had hoped. Take spreadsheets, for example. Once the template is developed and macrocommands are implemented, the operation is straightforward. . . Presto! All done.

> *'The way that operations start up is impressive. It's clear, clean and comprehensible. But when you call for the commands, splat! They come pouring onto the screen too quickly, and the presence of the computer becomes overbearing.'*

"The way that operations start up is impressive. It's clear, clean and comprehensible. But when you call for the commands, splat! They come pouring onto the screen too quickly, and the presence of the computer becomes overbearing.

"Spreadsheet development is downright intimidating. There's too much of the computer to deal with so that it gets in the way of my ability to construct the template in the first place.

'That's unobtrusive'

"The data base program falls into the same category. When the user starts off, there is nothing but a period to prompt the entry of a command — that's unobtrusive. But go beyond that — into the development of multiple file systems and the generation of command macros — and users find themselves unable to cope unless they become crackerjack programmers.

"Enormous strides have been made in keeping the complexities of computer technology away from the users. But there seems to be quite a way to go before the industry reaches the level of unobtrusiveness as automobile manufacturers.

"We appreciate that car buyers do not have to reprogram automobile engines. Technology is so well developed that, in spite of the complexity of the internal combustion engine, almost every citizen over the age of 16 can drive a car without understanding what's going on under the hood. Only when the nature of internally stored programs can be shielded from users to the same extent will computer systems be accepted by the entire business community."‡

Stone is a Washington, D.C.-based independent management consultant, educator and writer, specializing in DP human communications and personnel development.

Adopting a cost-of-quality metric for good measure

QUALITY
Wayne Smith

Data processing metrics have been a nagging disappointment to the industry for the last several years. Their almost total lack of acceptance by the commercial information management community stands in sharp contrast to the clear benefits that metrics appear to provide on paper or in journal articles.

One reason for this may be that metrics are often difficult to apply and don't appear to have an obvious correlation to the key business question: How do I better manage and organize my operation so that I can provide more effective services for the same cost?

Cost of quality may be the answer. Basically, cost of quality is a holistic metric that provides MIS with data on the total cost of producing DP quality systems for their users. Unlike many other local DP metrics, cost of quality is a global metric, measuring the full organizationwide DP costs.

Because it is a cost metric, it speaks the language of senior management. It becomes the definitive metric for MIS and provides both the initial motivation and ongoing performance measure for a quality program.

By using this metric, the MIS goal can be quantified quite easily: reduce the cost of quality by X%. Even if the goal is not met, the organization benefits by focusing management attention on relevant cost-of-quality factors.

Cost of quality as two components

If you think of MIS as a factory whose product is data and whose customers are the rest of the organization, then cost of quality can be thought of as comprising the two following components:

- Cost of conformance.

The prevention and appraisal costs associated with ensuring that the delivered systems meet their requirements. Prevention costs are generally one-time costs or are characterized by relatively stable, predictable growth. Typical prevention costs are standards, quality assurance functions, training and education.

Appraisal costs are incurred by the organization in its attempt to uncover defects in work products before they are shipped to production. Typical appraisal costs are reviews, inspections and testing.

These costs are generally proportional to overall systems development costs and, as a consequence, are also relatively stable.

- Cost of nonconformance.

The failure costs that the organization incurs when these systems don't meet their requirements.

Internal costs include project rework, corrective maintenance, reruns and excessive development costs. External costs include lost customers or lost business opportunities, unrealized or delayed systems benefits and lost MIS credibility within the organization.

> *Unlike many other local DP metrics, cost of quality is a global metric, measuring the full organizationwide DP costs. Because it is a cost metric, it speaks the language of senior management. It becomes the definitive metric for MIS and provides both the initial motivation and ongoing performance measure for a quality program.*

The failure cost components are by far the largest and represent the biggest opportunity for information services management to reduce its total cost of quality.

These components are not stable, and in fact, failure costs, by their very nature are characterized by rapid, sometimes exponential, growth.

The earlier that defects are uncovered in any systems development, package acquisition or maintenance process, the less expensive they are to correct. Accordingly, the cheapest defect is the one uncovered in its planning stages before it has been manifested in an actual physical work product. This is the key to prevention.

To use the cost-of-quality metric in an overall quality program, one must establish the current cost-of-quality numbers for the organization and incorporate them into key program functions, based on where the highest return can be made.

Establishing cost-of quality measures and developing a set of factors or procedures are critical to the success of the effort. The approach consists of taking each of the components and determining the total cost for that component.

Developing factors

Quality Data Processing by Claude Burrill and Leon Ellsworth provides a good first clue at what these factors could be for each component. In addition, Guide, the IBM Users Group Association, is planning to publish its cost-of-quality report this summer.

Once the factors have been identified, a set of simple, straightforward definitions are developed. For each factor, a specific measurement method is then specified. This method must describe exactly how one can compute the costs for that factor.

With the cost-of-quality metric, information services has at its disposal a truly fundamental measure of the organization's actual performance. It also has a practical tool to effect the cultural changes required for a successful quality program.‡

Smith is vice-president, specializing in quality, at Applied Information Development, Inc. in Oak Brook, Ill.

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SOFTWARE & SERVICES

AN INTERVIEW

Ronald Kopeck

Microcomputer-to-mainframe links have been touted as the answer to boosting end-user productivity and adding flexibility to computing environments. But as they grow from their infancy, micro-mainframe link products are only beginning to meet the needs of MIS departments attempting to bring data down to the end-user. Some micro-mainframe products allow limited access to mainframe files; others permit only downloading; and some provide only screen capture capabilities. Nearly all succeed in stirring up confusion among MIS managers.

Ronald Kopeck, president of San Francisco-based Edgetech Associates, a consulting group specializing in micro-mainframe communications, recently discussed the issues involved in selecting a micro-to-mainframe link with Computerworld *staff writer Maura McEnaney.*

Describe the state of technology of micro-mainframe links today.
Quickly evolving. Customers and vendors are becoming more sophisticated. Companies are beginning to realize users need selective data extraction and data summarization capabilities. More sophisticated links are providing access to the data base without requiring a user to know anything about how the data is formatted or laid out. Vendors are realizing that basic hardware emulation links only do part of the job and are creating departmental nodes from the host, tying [personal computers] into the nodes.

Are micro-mainframe links selling well?
By our [Edgetech] estimates, the link market will reach almost $1 billion by 1988. In 1983, about $40 million [of link products were] shipped. In 1984, the figure reached about $350 million. [Digital Communications Associates, Inc.] claims it alone is going to ship $40 million this year with the Irma board. Other companies are right on the edge of survival. Vendors have to push really hard to make their revenue goals each month, because users are not buying in volume. They are buying five and 10 products at a time. We projected that the big volume buys would come in the second half of '85, and we're still holding to that.

What is holding users back?
Initially, users rushed into connecting their micros into the host, so they ran out and bought Irma cards. Then they realized

See **Q&A** page 36

AT&T's Unix: the formula for revolution?

SOFTLINE
Thomas O'Flaherty

AT&T's Unix strategy is an exception to the general rule that the success of a software vendor's short-term strategy is not normally of interest to the broad data processing community.

AT&T's software strategy — specifically its Unix strategy — has major goals and, essentially, no software base to worry about disrupting. This is a formula for revolution. AT&T as a revolutionary is ironic. To understand why, look at Unix's history and the AT&T strategy.

■ Stage 0 (prehistory). Unix is created serendipitously by Bell Laboratories workers. Since AT&T could not at the time sell software commercially, it licensed Unix to universities but without any support. The power and flexibility of Unix, coupled with the need for self-support, made Unix an academic cult object. It also created almost as many Unix variants as users.

■ Stage 1 (standardization). AT&T is freed to compete and realizes that it has a diamond in the rough. Unix has a great name but it is not really a product, in that it is not standardized and, more importantly, not oriented to performing real work such as applications processing. Thus, AT&T begins to standardize. One part of the standardization strategy is for major chip makers to implement inexpensive firmware versions of Unix.

See **UNIX** page 35

O'Flaherty is a Wood-Ridge, N.J., consultant who helps corporations coordinate MIS planning and the development of computer-based products. He is a principal of Information Service Strategies.

■ Softscope, a compendium of news from the software industry front/**32**

■ Prime Computer enhanced the Primos operating system for its 50 series processors/**33**

■ Math Advantage, a library of scientific/engineering algorithms, was unveiled by Quantitative Technology/**33**

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350 ext. 1060.

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SOFTWARE & SERVICES

SOFTSCOPE

Notes from the software industry front

Applied Data Research, Inc. (ADR) and Billerica, Mass.-based Data Language Corp. have joined forces through a $2 million licensing agreement that allows ADR, located in Princeton, N.J., to develop software incorporating Data Language's Progress technology. Progress is an AT&T Unix- and Microsoft Corp. MS-DOS-based application development system. An ADR spokesman said the Progress technology represents an important addition to the company's IBM micro and mainframe product lines.

■

Look for a 1986 release of a version of the widely installed Syncsort, Inc. Syncsort sorting utility for Prime Computer, Inc. 50 series processors. Prime, headquartered in Natick, Mass., has contracted with Englewood Cliffs, N.J.-based Syncsort for the development of the new version, which will be the first Syncsort offering for the 32-bit superminicomputers. The version, currently under development, reportedly will be compatible with Prime's current sort utility.

■

Software AG Systems, Inc., based in Reston, Va., inked a joint development and marketing pact with American Software, Inc. of Atlanta to make American Software's application products available to Software AG's Adabas data base management system users. Through the agreement, according to a spokesman, native versions of American Software's materials management, distribution and accounting systems will be integrated with the Adabas relational DBMS and its Predict data dictionary.

■

Gould, Inc.'s Compion Access software has been purchased by Internet Systems Corp. of Sunrise, Fla. Access provides users of Digital Equipment Corp.'s VAX minis under VMS with a communications interface to local-area networks, the Advanced Research Projects Agency Network and the U.S. Department of Defense's Milnet. Internet plans to integrate Access into its existing Hyper-Link communications software line.

■

Digital Equipment Corp. in Maynard, Mass., and Cognos Corp., of Peabody, Mass., have penned a cooperative marketing agreement for Cognos' Powerhouse fourth-generation language. DEC also linked up with Tektronix, Inc.'s Computer-Aided Engineering Systems Division, Sunnyvale, Calif., in a cooperative marketing agreement for the CAE 2000 integrated, hierarchically structured electronic design software. CAE 2000 capabilities reportedly include schematic capture, logic and circuit simulation and timing verification.

■

SAS Institute, Inc. of Cary, N.C., will begin marketing Lattice, Inc.'s C Native compiler for IBM 370 architecture systems as the result of an open-ended agreement signed by the two companies. SAS already markets Glen Ellyn, Ill.-based Lattice's IAPX 86 C cross-compiler.

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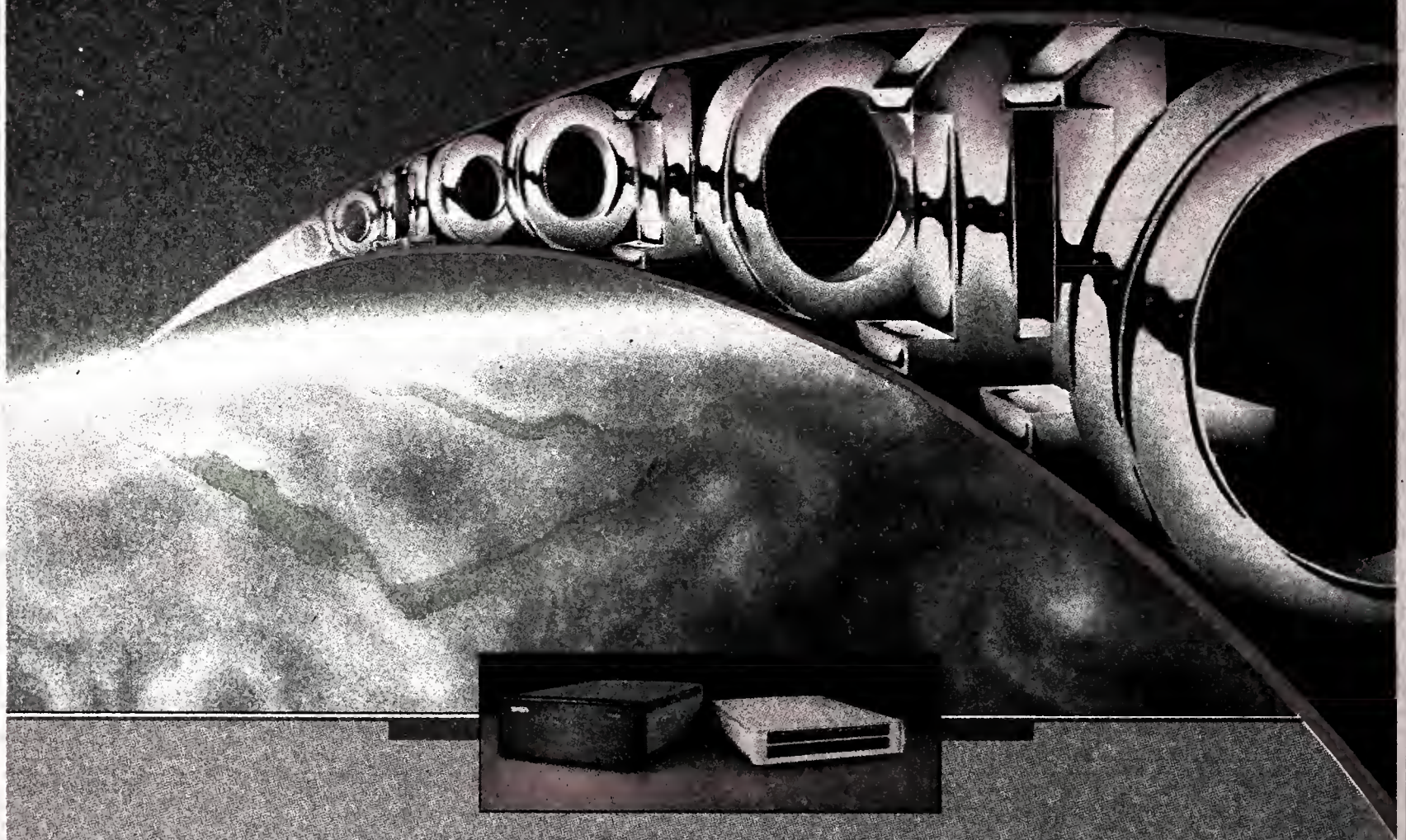

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Enhanced Primos boosts processor performance by 50%

NATICK, Mass. — Prime Computer, Inc. has introduced an enhanced release of its Primos operating system that is said to increase the performance rating of its current 50 series processors by nearly 50%.

According to a Prime spokesman, Primos Revision 19.4 increases the Whetstone performance rating of the 50 series machines by up to 45%. Whetstone ratings measure CPU performance in executing floating-point instructions used in applications such as finite element analysis, computer-aided design and simulation.

Revision 19.4 also features support for IBM's Systems Network Architecture and kernel support for Prime's recently announced Primix version of the AT&T Unix operating system. In addition, the enhanced version of Primos increases the number of asynchronous communications lines supported from 128 to 254 and roughly doubles the maximum program size supported from 32M bytes to almost 64M bytes.

The spokesman said the enhanced release employs a new run-file format called Executable Program Format that automatically shares programs and libraries among users. An additional improvement gives systems administrators increased control over the allocation of resources by allowing limitations to the number of segments and programs in each user's address space.

Revision 19.4 features improved security capabilities said to alert the system console to any logon attempt involving an incorrect user or project identification or password.

Revision 19.4 is available immediately. It is included in the pricing of the 50 series processors, which ranges from $30,000 to $500,000.

Prime Computer is located at Prime Park, Natick, Mass. 01760.

Firm's algorithm library out

BEAVERTON, Ore. — Quantitative Technology Corp. has announced Math Advantage, an extensive library of algorithms designed for use in numerically intensive scientific and engineering applications.

According to a company spokesman, Math Advantage was designed to improve the productivity of engineers and scientists who are developing high-speed applications that run on supercomputers and array processors.

The product operates on more than 20 different processors, ranging from the IBM Personal Computer to supercomputers, according to the vendor.

Math Advantage features nearly 180 coded and documented subroutines that can be called from programs written in either Fortran or C language using standard calling conventions used by computer manufacturers, according to the spokesman.

Routines can be tailored

For specific architectures, the spokesman said, Quantitative Technology will tailor the routines for performance.

For ease of use, the library is reportedly divided into categories containing groups of algorithms that provide a core for various applications.

Corporate and site licenses are available for multiple systems and multiple site installations.

Available immediately, Math Advantage is priced at $495 for micros, $2,000 for 32-bit workstations, $5,000 for superminicomputers, $7,500 for minisupercomputers and $10,000 for supercomputers.

More information is available from Quantitative Technology, which is located at Suite D, 8700 S.W. Creekside Place, Beaverton, Ore. 97005.

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Mega Group unwraps IBM mainframe WP package

Moves data to documents

IRVINE, Calif. — The Mega Group, Inc. has announced Megaword, a mainframe word processing package that enables users to move data from multiple spreadsheets into multiple documents. The Megaword package runs under IBM VM/CMS, MVS/TSO and MVS/XA environments.

Megaword's features include mail/merge facilities, printing support, menu systems, key sequences and editing capability, according to the vendor.

When a system has a microcomputer-to-mainframe link in place, Megaword on the mainframe enables users to read and write microcomputer and mainframe text files, according to a spokesman.

The product is said to be aimed at managers who wish to retrieve data from a central computer, create models and write reports.

Microcomputer users can use Megaword to store files on the CPU, enter or manipulate text and interact with other programs, Mega Group said.

Data reportedly can be transferred to Megaword from the company's other mainframe software, including the Megacalc spreadsheet, the Megafile file handling system, Megagraph decision support graphics and the Megastat statistical analysis package.

Megaword is priced from $4,000 to $6,500, depending on processor size, the vendor said.

Additional information is available from the Mega Group, which is located at 17701 Mitchell Ave. N., Irvine, Calif. 92714.

HP tool touts data base duplication

PALO ALTO, Calif. — Hewlett-Packard Co. has announced the HP Silhouette/3000 software for duplicating HP Turboimage and Image data bases on an HP 3000 superminicomputer.

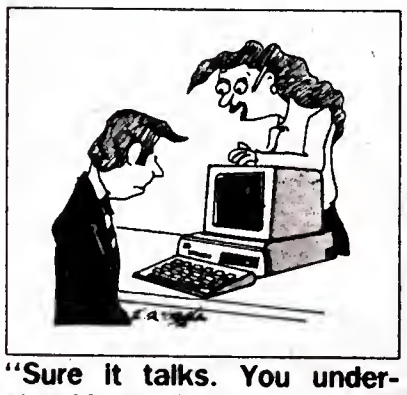
The HP Silhouette/3000 is transparent to system users and duplicates the central HP 3000 data base on remote HP 3000 systems using network links. During a hardware or software failure, the primary data base shadow allows remote HP 3000 users to continue using data base applications, according to a spokesman.

When system messages indicate a failure has occurred, an operator transfers production from the main HP 3000 to another HP 3000 in the network. Incomplete transactions are removed from the secondary data base when a failure occurs to ensure data integrity. Users who need only inquiry access to a data base on the main HP 3000 system can be permanently moved to a secondary system for improved performance.

HP Silhouette was developed by Carolian Systems International, Inc. under the name Shadow. Marketed by Carolian Systems since September 1984, HP Silhouette/3000 is now being marketed by HP under a licensing agreement.

HP Silhouette/3000 is priced at $22,000 for the first copy; additional copies cost $9,000.

HP is located at 3000 Hanover St., Palo Alto, Calif. 94304.



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SOFTWARE & SERVICES

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■ Stage 2 (hardware). AT&T produces Unix-based machines of its own and encourages other vendors to do the same. Many minicomputer makers and Bunch companies express support.

■ Stage 3 (software). Enough Unix-based applications exist so that Unix becomes a self-contained world with families of Unix processors running a standardized Unix with all necessary applications modules.

Where is AT&T now? Stage 1 is almost successfully completed. AT&T's System V version of Unix will almost certainly triumph, and Unix microprocessors will soon be readily available.

Stage 2 has received good support, although the real test will be how many other hardware vendors give Unix wholehearted support. Stage 3 is a complete question mark.

The key to success in Stages 2 and 3 is successful partnerships.

Support two operating systems

First, consider what would happen to a computer manufacturer other than AT&T that gives Unix enthusiastic support. For some period of time — probably a lengthy one — the vendor would have to support at least two operating environments, its own proprietary operating system and Unix.

Vendor-supplied utilities and applications would have to be rewritten and then supported. The additional overhead would be significant. Sales of Unix-based systems would have to be large to justify such an investment. However, the more firms selling Unix-based systems, the less any one will benefit from the "Unix effect."

Even success with Unix would have its own pitfalls. A vendor's non-Unix customers would begin to wonder about the vendor's commitment to their needs. They might think, "As long as we have to make a conversion, we might as well go to IBM."

Unix success would have an even more disastrous effect for some manufacturers. Their hardware would become a commodity. Only low-cost producers would survive.

Thus, it appears against the interest of any established domestic hardware manufacturer — with the partial and ironic exception of IBM — to support Unix wholeheartedly.

Established independent software vendors would have at least as many problems as computer manufacturers. Those problems would include high development costs, duplicate support and enhancement costs and the obsolescence of existing products.

De facto standards

Unlike the hardware sector, Unix would not really introduce much in the way of software standardization since, at least for independent vendors, IBM's MVS and Microsoft Corp.'s MS-DOS have become de facto standards.

Would Unix-based software be inherently more desirable? The portability of Unix applicatons across different sizes of machines is a plus. So is its potential to be used in true distributed applications.

However, set against this is the increasing requirement for integrated, data base-driven applications. It would, for example, take many years to develop Unix equivalents to the Cullinet Software, Inc., McCormack & Dodge Corp. and Management Science America, Inc. families of products.

The flexibility of Unix is a two-edged sword. Unix applications buyers should not be allowed to get to the Unix core, since it takes systems programmer skills to deal with Unix. This is not a good advertisement for package flexibility or economy.

Given this set of issues, it is doubtful that many of the major producers of IBM-compatible software would see enough advantages to their customers and themselves to become Unix vendors. Only an attempt by IBM to reclaim large parts of the software market could force current software vendors into the Unix camp.

The essence of a partnership strategy is that both sides benefit. If the preceding analysis is on the mark, then many AT&T partners could find themselves disappointed; others could find themselves out of business.

What of AT&T itself? Certainly the widespread acceptance of Unix would benefit the company firm most iden-

See **UNIX** page 36

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UNIX from page 35

tified with Unix.

It is not clear that AT&T can successfully produce commodity hardware. It is possible that AT&T could create a large amount of successful software in a short period of time. But no other firm has ever done so.

Hardware and software are coalescing around de facto IBM standards. The only flaw in this IBM world is the lack of good bridges between MVS and IBM's PC-DOS, but such bridges are now being built. Unix could never displace MVS applications inside large organizations. Consequently, a successful Unix would add complexity and costs.

However, AT&T is, at least implicitly, dedicated to just these goals. This puts AT&T, perhaps unconsciously, into the role of arch-revolutionary. Only revolutionaries benefit from damage to the existing — IBM — order.

Q&A from page 31

they had to be more methodical in their integration strategy. Users didn't want [links] to grow out of control, and they became more sophisticated about the technology. Companies are now caught at the point between just buying emulation products and attempting to get a more sophisticated, more transparent [micro-mainframe] solution that runs at a capacity and performance level consistent with the rest of their data center.

What are the most important steps a company should take when selecting a link?

Users [should] sit down and prepare a needs assessment. That means knowing what applications are going to run where. You have to know what you are going to run on the [personal computer] and what you [are] going to run on the host. Second, you must know the applications you are planning to install over the next two years.

What are the most common mistakes firms make when selecting a micro-mainframe product?

Not looking at the type of applications they have. Some companies buy an [IBM] 3270 emulator for mainframe connection and then find out that it is insufficient for their transfer needs. Another common mistake is that products are selected in a vacuum. When companies rely only on a technician to select the products, electronics are emphasized, not business applications.

Others look at a link as something that will implement the application. A link simply helps you move the data. As soon as you tie the application to the link, it will be more difficult to change. What may be a good link solution today may have to be changed in 18 months.

How can companies best deal with security issues presented by micro-mainframe links?

Right now, we still believe in centralized host security. Basically, links today don't provide any security. If the host system doesn't have any security, you don't have any.

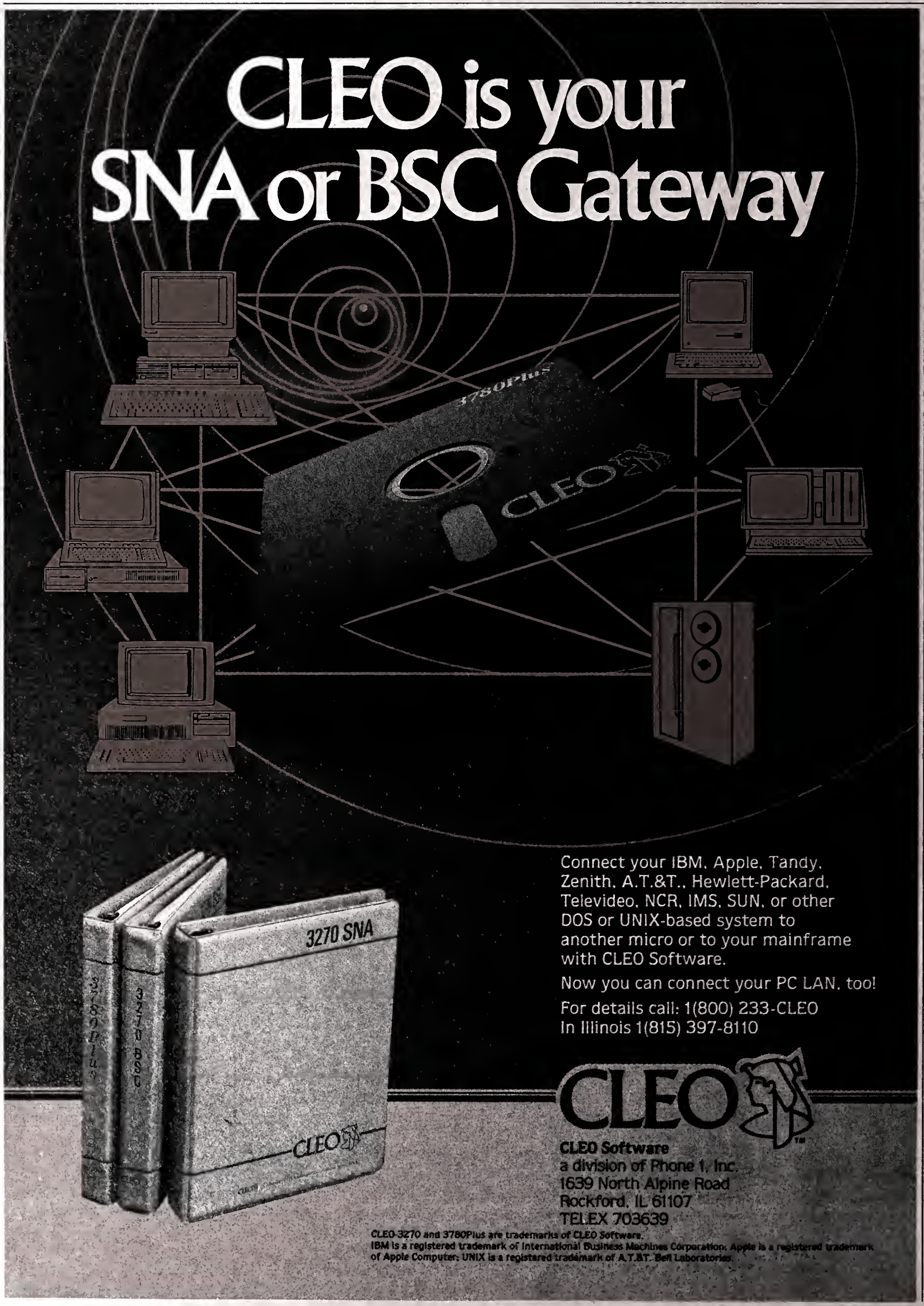
Try to maintain centralized host control if you can. Make sure that when the data comes back to the mainframe, you can refer to an audit trail. Make sure you know who updated it and when they updated it. One solution is to put the uploaded data into a temporary holding area and allow the systems administrator [to] take care of the updates by running a separate job.

What kinds of applications are most commonly used with micro-mainframe links?

Financial applications where departmental budgets have to be rolled up into one corporate budget. In the manufacturing sector, we're seeing users make inventory data available on micros to manage production lines. In the retail sector, buyers can enter data to the mainframe via the [personal computers].

What will IBM's micro-mainframe strategy be?

I'm not so sure that [it] will jump into the fray with micro-mainframe link products per se. I suspect [it is] going to get into it via a more integrated approach, very much like what [it is] doing with the System/36. IBM has a lot of work to do to make all [its] systems integrate cleanly. I think there is still a big window for companies to develop a better mousetrap.



MICROCOMPUTERS

Firm releases decision tool for IBM micros

NEW YORK — Announcing its merger with software vendor Management Decision Systems, Inc. late last month, Information Resources, Inc. a Chicago-based marketing research firm also unveiled PCexpress, a decision support system for the IBM Personal Computer, Personal Computer XT, AT and compatible machines.

The $1,495 PCexpress package is designed for decision support system applications in marketing and finance and combines data base management, query, modeling, statistical, reporting and graphics capabilities.

Graphics functions include capabilities for representing line plots, clustered and stacked bars, pie charts and scatter diagrams.

The product includes communications capabilities that allow users to access data from Information Resources' Express Decision Support System on IBM mainframes running VM/CMS and Prime Computer, Inc. systems running Primos, according to the vendor. Flat data files can be captured from any host computer that can communicate with an Ascii terminal, the vendor said.

The software reportedly permits a two-dimensional representation of business information, including different time periods, products, regions, customer types and distribution channels.

A menu interface, a mouse-driven interface, on-line documentation and user-defined Help screens are included.

PCexpress will be available during the fourth quarter.

As a result of Management Decision Systems' merger with Information Resources, all outstanding shares of Management Decision Systems common stock were converted into approximately 1.04 million shares of Information Resources common stock valued at approximately $26.1 million.

More information is available from Information Resources, 200 Fifth Ave., Waltham, Mass. 02254.

Designer aims to create more flexible software

By Eric Bender
CW Staff

"When I'm designing software I picture myself inside the computer, staring out at you," said Lotus Development Corp.'s principal technologist, framing his face with his hands to illustrate himself looking out through the screen of a microcomputer.

This perspective highlights the computer's raw speed, S. Jerrold Kaplan remarked in a recent interview. "Type a letter, and the program has all the time in the world to figure out what you need," he pointed out. Taking advantage of that time, "the program can adapt and become much more responsive — reach a higher level [of] activity."

Kaplan

Another way to describe the goal, according to Kaplan, is "creating new ways for people to instruct a computer which are vague. That allows the computer to interpret rather than execute commands; to be reactive, not passive." It also requires users to relinquish "the idea that the computer is always right."

Kaplan, 33, earned a doctorate in computer science from the University of Pennsylvania and did research at Stanford University before cofounding Teknowledge, Inc., a pioneer in artificial intelligence software, in 1981. At Teknowledge, he first handled marketing and sales and then moved into corporate development. Finding himself investigating technology that was outside of Teknowledge's main business, he left the company this year, although he still acts as a consultant. Last spring Kaplan struck a deal to consult for Lotus on a variety of projects, and he also is contracted to develop a software product. He works at home in Portola Valley, Calif. "When appropriate I hop on a plane and come East," he said.

See **KAPLAN** page 41

Who will buy System/36 PC?

SMALL TALK
By Eric Bender
CW Senior Editor

IBM's System/36 PC, a truly curious machine, answers some questions about how Big Blue will link Personal Computers with its low-end multiuser systems. But the hybrid's current incarnation does not look much like a mainstream product for large corporations.

The System/36 PC does underline IBM's commitment to distributed computing. Here is a machine with workstations that may offer significantly more power, in some applications, than does a central CPU supporting a single user.

IBM did not release performance specifications on the 16-bit machine, but the current maximum internal memory is 256K bytes, and only three workstations are supported if a system printer is attached.

That makes the System/36 PC's pricing competitive but unremarkable. While many analysts were initially suprised that IBM would offer any System/36 with a $5,995 sticker, that starting price rises sharply for any reasonable configuration. The directly attached Personal Computer is a requirement, as is the $995 operating system, so a single-user-base configuration costs almost $10,000

See **IBM** page 42

■ Enertronics Research introduced a package that links mainframe graphics packages with IBM Personal Computers/**38**

■ Software Solutions upgraded its Dataease data base management system software/**38**

INSIDE

Software/**39**

WHO IS THE WORLD LEADER IN IBM/38-36 BACKLOG REDUCTION?

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Software allows IBM micro to use mainframe graphics

ST. LOUIS — Enertronics Research, Inc. has introduced software for communication between mainframe graphics packages and the IBM Personal Computer.

The product, Enerconnect, runs on the Personal Computer and converts it into an IBM 3270-type graphics workstation that is able to communicate with a mainframe via an IBM 3274, 3276 or 3705 communications controller, according to Enertronics Research.

The software permits the Personal Computer to manipulate files downloaded from such mainframe graphics packages as Issco, Inc.'s Tell-a-Graf and Disspla.

Additionally, International Graphics Exchange Specification (Iges)-based mainframe computer-aided design files can be displayed and files from Enertronics' Energraphics graphics program can be merged with mainframe graphics files, the vendor said.

The latter feature permits data from such Personal Computer spreadsheet programs as Lotus Development Corp.'s 1-2-3 to be incorporated into a mainframe file.

Enerconnect is priced at $500 for use with IBM's Graphics Data Display Manager-based mainframe graphics software and at $650 for use with Iges-based mainframe graphics packages, according to the vendor.

The software requires 256K bytes of internal memory, IBM PC-DOS 2.0 or later, a graphics board such as the IBM Standard Graphics Adapter and a communications board.

For additional information, Enertronics Research is located in Suite 207, 150 North Meramec, St. Louis, Mo. 63105.

SCIENCE/SCOPE

The first full-scale development Amraam missile was fired successfully at the White Sands Missile Range in New Mexico. The missile was launched from a U.S. Air Force F-16 at 40,000 feet at a speed of Mach 1.2. It flew a preprogrammed course designed to evaluate the missile's control system and separation from the launch aircraft. It did not have a seeker but instead was programmed through its autopilot to fly a prescribed route. The advanced medium-range air-to-air missile is in full-scale development at Hughes Aircraft Company for the U.S. Air Force and Navy.

A new technique may expand the use of lasers in commercial and military applications. The approach, called optical phase conjugation, is considered a major advance in optics because it offers a solution to distortion problems that have limited the use of lasers. When a laser beam passes through a turbulent atmosphere or a severely strained optical component, the beam is distorted and the information it carries is degraded. The Hughes technique, however, forces the laser to retrace its path through the distorting medium so the beam emerges free of distortion. The method eliminates the need for complex electro-optical and mechanical components to correct the distortions.

A new process called vacuum brazing will soon help manufacture advanced radar components for U.S. fighter aircraft. Vacuum brazing forms extremely strong joints between lightweight metals, allowing engineers to design parts that previously could not be manufactured. The process involves treating parts with a special brazing alloy and a small amount of magnesium. The parts are placed inside the vacuum furnace, which normally operates at a pressure of one millionth of an atmosphere, and heated to temperatures of 1100°F. Because vacuum brazing requires no flux, it is far more economical than conventional flux dip brazing, in which components are dipped into molten salts. The process also eliminates corrosion caused by trapped or residual flux. Hughes engineers are investigating how vacuum brazing might be used to fabricate heat dissipators and other radar parts.

Acting as a kind of design and manufacturing prompter, a new artificial intelligence network increases productivity by automatically generating instructions for assembling complex electro-optical devices. The Hughes Integrated Classification System (HICLASS™) analyzes product design information to determine the best assembly techniques. It then selects the most efficient manufacturing processes available. Operators, on demand, are able to call up appropriate graphical and text instructions in color as they interact step by step with the system. As a result, workmanship improves substantially and products are made better.

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For more information write to: P.O. Box 45068, Dept. 71-9, Los Angeles, CA 90045-0068

HUGHES
AIRCRAFT COMPANY

Dataease enhanced

MILFORD, Conn. — Software Solutions, Inc. has announced enhancement of its Dataease data base management system for the IBM Personal Computer.

Dataease 2.5, priced at $600, reportedly offers a procedural language that does not require programming knowledge. It also requires fewer keystrokes to generate reports than needed in past versions and includes on-line transaction processing.

A relational data base manager, the software is also said to include such features as a library report template and expanded memory usage. Support for the Intel Corp. 8087 math coprocessor is included.

The software reportedly provides text-converted dollar amounts and complete date conversion functions.

Software Solutions is located at 305 Bic Drive, Milford, Conn. 06460.

NEC voice board out

MELVILLE, N.Y. — NEC America, Inc. has introduced its SAR-10 Voice Plus voice recognition board for the IBM Personal Computer.

The SAR-10 reportedly utilizes a custom large-scale integration chip set with a 250-word capability. Spoken words are digitized, and user-defined Ascii outputs are then transmitted to the Personal Computer.

The board comes with I/O jacks for attachment of microphones or speakers and with utility programs that reportedly allow voice I/O to be integrated into new and existing software applications. The SAR-10's menu reportedly lets the user create a vocabulary that defines spoken words.

The SAR-10 costs $895.

NEC America can be reached at 8 Old Sod Farm Road, Melville, N.Y. 11747.

Microstuf updates telecom software for IBM micro

ROSWELL, Ga. — Microstuf, Inc. has introduced Crosstalk Mark 4, a $245 telecommunications software package for use on the IBM Personal Computer.

Crosstalk Mark 4's features are said to include support for multiple concurrent communications, under which the software can accommodate 15 separate communications sessions simultaneously. Also supported are combinations of up to 15 local, modem and X.PC logical links, each occupying a page within the program. Crosstalk Mark 4 reportedly operates at up to 19.2K bit/sec. and emulates such terminals as the IBM 3101, in both page and character modes; the Digital Equipment Corp. VT100 series; the Televideo Systems, Inc. 912, 925 and 950 models; and the Applied Digital Data Systems, Inc. Regent and Viewpoint.

Crosstalk 4 permits the creation of macros that can automatically dial up and log in to remote systems.

All major file transfer protocols are supported, including Kermit, MNP, Xmodem and X.PC.

Microstuf is located at 1000 Holcomb Woods Pkwy., Roswell, Ga. 30076.

IBM offers law modules for its System/36 PC

WHITE PLAINS, N.Y. — IBM has introduced two families of software modules for the IBM System/36 PC in use in law offices.

The Series 700 grouping includes individual programs for client financial management, lawyer financial management, law firm financial management, accounts receivable collections, statutory dates (docket), conflict of interest, client/matter records management, client statements and a controller system.

The second family of software products, the Series 900, reportedly offers expanded features for larger law firms and includes such programs as client financial management, lawyer financial management, client statements, library management, litigation support, research and retrieval and accounts receivable collection, among others.

Packages in the Series 700 family are priced from $175 to $2,250. Cost of software in the Series 900 family ranges from $175 to $6,400.

For further information, the National Accounts Division of IBM's Information Systems Group is located at 1133 Westchester Ave., White Plains, N.Y. 10604.

SIS unwraps Smart Ollie 1

NEW YORK — Strategic Intelligence Systems, Inc. (SIS) has announced a current economic information data base for strategic planners in corporations, research organizations and government.

Smart On-Line Linking of Intelligence for Executives (Smart Ollie 1) is stored on a floppy disk to run on the IBM Personal Computer XT and Personal Computer AT. The product reportedly is a data base of current business trends and issues and relevant written summaries that are accessible to the user by keyword searches.

Smart Ollie 1 is said to contain a cross-reference system that links current economic, social, political and technological trends to business issues, helping users focus their research on relevant connections within the data base.

The product uses a natural English language front end for user interaction. It requires 640K bytes of memory, PC-DOS 2.0 or later and a hard disk.

The cost of Smart Ollie 1 software is $7,500, and users receive updated diskettes monthly.

SIS is located at 575 Madison Ave., New York, N.Y. 10022.

SOFTWARE

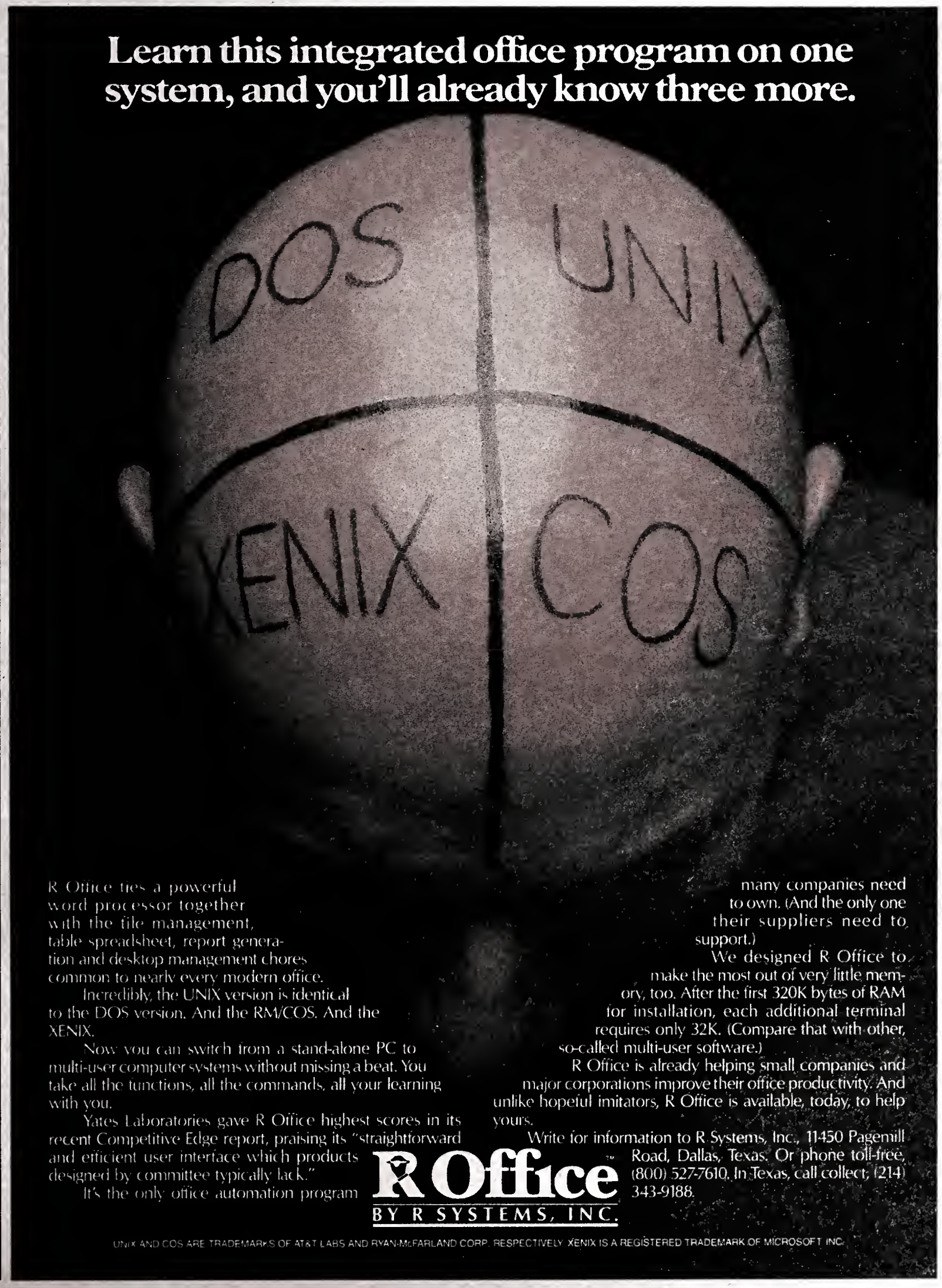
■ Computervision Corp. has introduced its Personal Architect software system for use on the IBM Personal Computer AT.

Five software packages are available.

The packages include the following: architectural design and drafting ($9,200); advanced architectural drafting ($5,800); schematic/urban design ($3,500); architectural drafting ($2,500); and CV/CFMS, based on CFMS from Harper and Shuman, Inc., which includes modules for Project Control System ($1,995), Accounting System ($1,995), Payroll System ($395), Spreadsheet Interface ($95) and Billing System ($395).

A turnkey system is available at $13,200 for an IBM Personal Computer AT with architectural drafting

Continued on page 40



MICROCOMPUTERS

Continued from page 39

and graphics capability; and at $19,900 for a turnkey system including all the capabilities of architectural design and drafting.

The software requires a minimum of 512K bytes of random-access memory and IBM's PC-DOS operating system.

Computervision, 15 Crosby Drive, Bedford, Mass. 01730.

■ **Information Processing, Inc. (IPI) has announced a micro version of its Blis/Cobol operating system for minicomputers.**

PC-Blis reportedly allows users to run multiuser Blis/Cobol programs on the IBM Personal Computer XT and Star Technologies, Inc. PC. The software is said to support up to three Blis/Cobol users or two Blis/Cobol users and one PC-DOS user concurrently.

Blis/Cobol applications can operate on the micro running PC-Blis with no changes to the applications or files, according to the vendor.

PC-Blis resides in 256K bytes of memory. It is priced at $2,190 for a single-user system and $190 for each additional user. A Blis-to-Blis communications option that allows micro-micro or micro-mini file communications is available for $230.

IPI, 401 Whooping Loop, Altamonte Springs, Fla. 32701.

■ **Unisource Software Corp. has announced a version of the Connector utility software for the AT&T Personal Computer 6300. The product was previously available for the IBM Personal Computer, Personal Computer XT and Personal Computer AT.**

The Connector reportedly allows users to run an IBM PC-DOS and an AT&T Unix application concurrently on the same machine. The software enables the user to switch between PC-DOS and Unix with a single command, combining the multiuser and multitasking capabilities of Unix with PC-DOS programs, the vendor said.

The Connector running with PC-DOS and Unix requires a minimum of 512K bytes of memory.

The software costs $350.

Unisource Software, 71 Bent St., Cambridge, Mass. 02141.

■ **Koch Industries has announced a version of its Sweep utility software for use with the Microsoft Corp. MS-DOS operating system on the IBM Personal Computer. Sweep was previously available for the Digital Research, Inc. CP/M operating system.**

PC Sweep reportedly allows for concurrent execution of several MS-DOS commands. It also reportedly allows users to search files stored in any memory device and monitors the total amount of memory currently being used.

PC Sweep requires 128K bytes of memory and costs $79.95.

Koch Industries, Building G, 11 W. College Drive, Arlington Heights, Ill. 60004.

■ **Intel Corp. has announced Irmx 286, a real-time operating system for micros incorporating Intel's 80286 microprocessor, including the IBM Personal Computer AT.**

The Irmx operating system is said to permit users to access expanded memory and hardware traps built into the 80286 chip. Those traps reportedly can detect up to 90% of typical programming errors.

Irmx can address up to 16M bytes of memory and can be tailored to the needs of the specific application with which it will run, Intel said.

Irmx is priced at $7,500, according to the vendor.

Intel, Literature Department W-232, 3065 Bowers Ave., Santa Clara, Calif. 95051.

■ **Fox & Geller, Inc. has introduced Passkey, a work sheet security program for use with Lotus Development Corp.'s 1-2-3 spreadsheet on the IBM Personal Computer.**

Passkey reportedly protects against unauthorized use by permitting users to give each work sheet a password, without which access by others is prohibited. It also prevents access by permitting a work sheet to be encrypted.

The software resides in memory alongside 1-2-3, according to the vendor. No interruption of the spreadsheet is required for Passkey to be invoked.

Passkey is priced at $49.

Fox & Geller, 604 Market St., Elmwood Park, N.J. 07407.

■ **Online/Database, Inc. has introduced Application Builder, a fourth-generation applications development tool for the IBM Personal Computer.**

Application Builder was designed for use in developing software compatible with Cullinet Software, Inc.'s IDMS data base and ADS/Online language.

Application Builder permits users to develop applications for the Personal Computer and compatible machines and for IBM mainframes, according to the vendor.

The package is priced at $3,500, the vendor said.

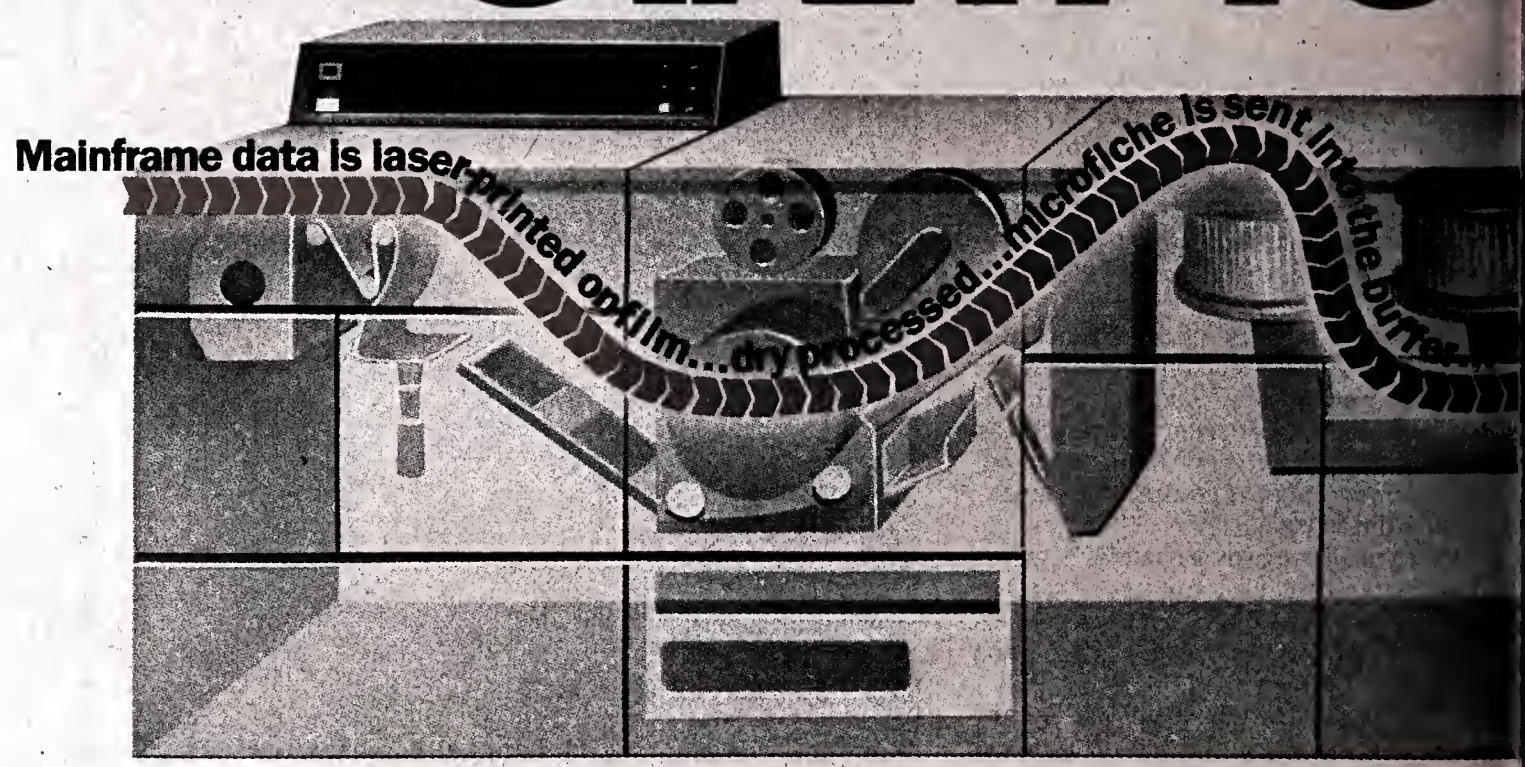
Online/Database, 350 Phillips Hill Road, New City, N.Y. 10956.

■ **United Software Security, Inc. has announced an enhanced version of its Privacy Plus security software and introduced the Private Eye security package. Both programs run on the IBM Personal Computer, Personal Computer XT and AT and compatible micros.**

Continued on page 41

KODAK INTRODUCES THE COM

AUTOMATIC START TO



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There's also an exclusive buffer for fiche masters, automatic exposure adjustments triggered by bar codes, and a programmable

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KAPLAN from page 37

His position with Lotus began when Chairman Mitchell Kapor "approached me, we discussed what the effect of AI would be on the personal computer market, and I told him I think I know the answer," Kaplan said.

Kaplan, who describes AI as "a bad name for what I would call symbolic processing," sees three main routes by which AI or symbolic processing techniques can improve micro software. The most obvious, and hardest to discuss publicly in any detail, is in building new types of applications, he noted.

A second group of opportunities arises in enhancing existing applications, "altering the computer so that it becomes a partner in the problem," he said. Taking a spreadsheet program as an example, why not take all the information developers have about how spreadsheets are used and "design it, if I may anthropomorphize slightly, to know more about its anticipated use?" he asked.

'I'll show you a fool'

With this setup, users "must be tolerant of the system not always doing what they want," but this is acceptable as long as they know what's happening, he maintained. "People are accustomed to getting misinformation, and they know how to deal with it. Show me someone who trusts their computer output, and I'll show you a fool."

A third promising avenue of development lies in "improving the efficiency of the internal program," Kaplan said. "Typical architectures aren't flexible enough."

In one illustration from the AI world, Lisp machines often startle novice users by flashing a "disk-in-use" signal even when the system hasn't been asked to do anything recently, he said. "The computer knows you're just sitting there, and it's off cleaning itself up."

Kaplan has written prototype microcomputer software that bypasses the operating system so that "if it hasn't heard from you in 500 [msec], it will go off and do something," he said.

Today's personal computers offer plenty of power for this breed of software, he added. "I don't believe that special hardware or symbolic languages are required for this current generation of machines. The idea that we as software developers are waiting for a new generation of hardware is nonsense."

Continued from page 40

Privacy Plus Version 2 is said to offer ease-of-use enhancements such as resident code, improved displays, function keys and an on-line directory manager. Version 2 includes additional error protection, preconfigurable user options and an optional Master Key facility to recover from lost passwords. Version 2 requires 128K bytes of memory.

Private Eye reportedly allows the micro user to clear the screen at any time with a single keystroke without disturbing on-screen data. The software also blanks the screen automatically after a period of computer inactivity, preventing unauthorized people from viewing data and reducing screen wear.

Privacy Plus Version 2 costs $975 for a yearly site license and $2,925 for a corporate license. The Master Key option is priced at $300 and $900 for site and corporate license holders, respectively.

Private Eye is priced at $300 for an annual site license and $900 for an annual corporate license.

United Software Security, 6867 Elm St., McLean, Va. 22101.

■ **Gracon Services, Inc. has announced a software package for Pascal programs on the IBM Personal Computer.**

Turboref reportedly allows users to cross-reference a Pascal program and create a program listing. The software creates a list of each variable and constant reference in a given program, including the line number and type of use for each reference. The program listing includes boxes to indicate program control structures, underlines Pascal reserved words and highlights procedure names and comments.

Turboref requires an IBM Personal Computer with 128K bytes of main memory and PC-DOS Version 2 or higher.

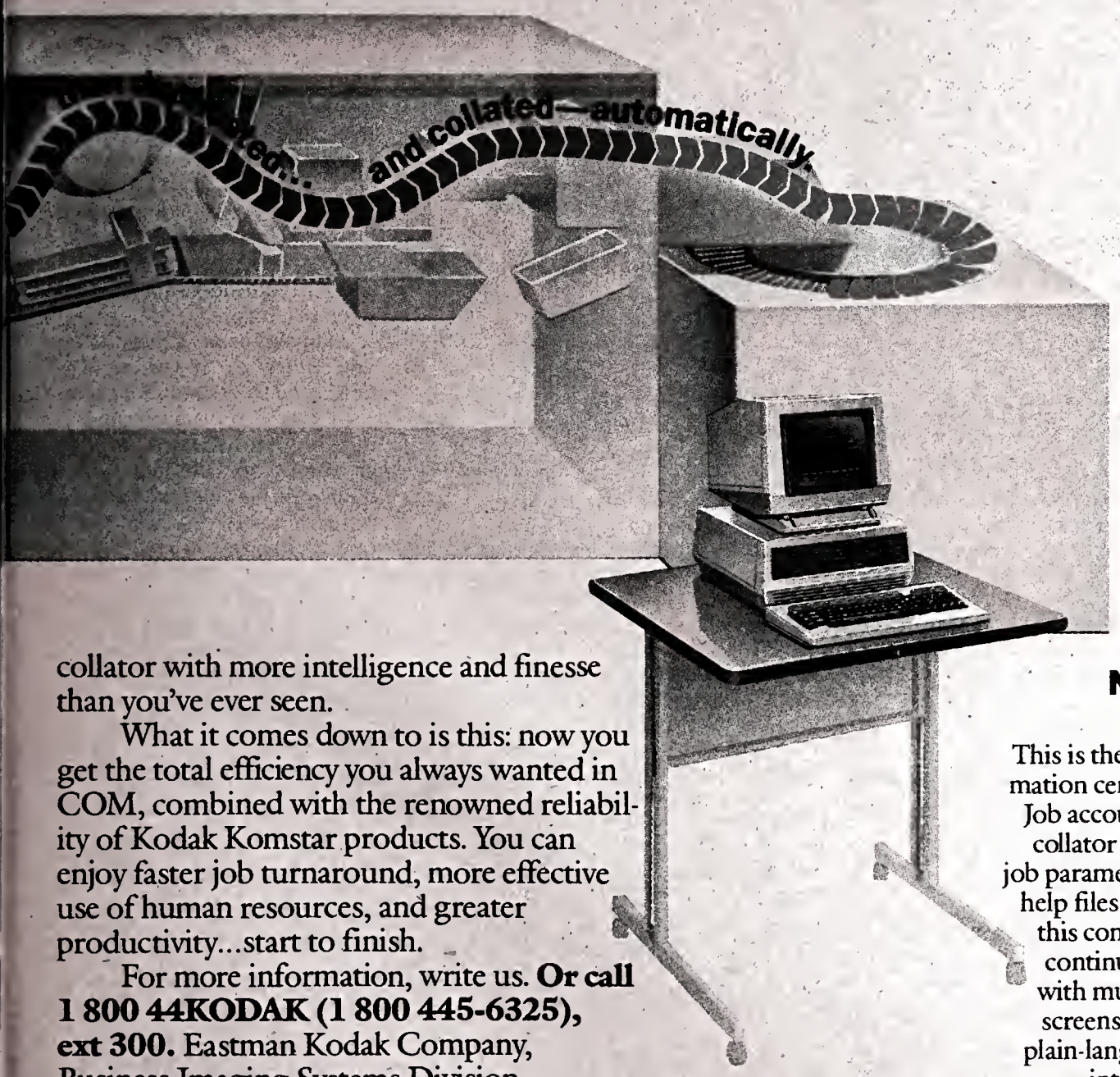
The software costs $49.95.

Gracon Services, 4632 Okemos Road, Okemos, Mich. 48864.

See **TOOLS** page 42

THAT DOES IT ALL:

THROUGHPUT, FINISH



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For more information, call Dave Shapiro (212) 564-9147.

SYS-ED

35 WEST 35 STREET, NEW YORK, NY 10001

TOOLS from page 41

■ JB Systems has announced six application modules for its Mainsaver business software on AT&T 3B2 supermicros, IBM Personal Computers and compatible machines.

The modules include work order processing and scheduling, budgeting, maintenance history, inventory management, preventive maintenance and purchase order systems. They are designed for use by plant management and equipment maintenance personnel.

The software system reportedly can generate a series of daily, weekly and monthly management reports including equipment history and costs, work order backlog, work load forecast and summary, deferred maintenance and status information.

Prices range from $975 for one module to $27,800 for the full six-module system.

JB Systems, Suite 640, 21600 Oxnard St., Woodland Hills, Calif. 91367.

■ The Onware Project has announced Ontime, a data base manager-driven project-scheduling system for microcomputers that run Ashton-Tate's Dbase II.

Ontime supports fixed and variable time and costs, automatically calculates time budgets when job quantities are defined or varied and will not overcommit resources, the vendor claimed.

The scheduling system is said to interface to Dbase, Ashton-Tate's Framework and Lotus Development Corp.'s 1-2-3 and Symphony.

Ontime costs $495.

The Onware Project, 525 California Drive, Burlingame, Calif. 94010.

■ Blackridge Corp. has unveiled Inside, a two-pass

Continued on page 44

UNIX™ SYSTEM V. SOFTWARE THAT STACKS UP.

High-quality application software written for **UNIX** System V is available now. And new business programs are continually being developed.

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And we've introduced the System V Interface Definition. Software written under the Interface Definition can run on current and future releases of AT&T's **UNIX** System V, as well as various System V derivatives offered by AT&T licensees. So there will be an even larger, more comprehensive base of portable software from which to choose.

Our comprehensive **UNIX** System V Software Catalog lists a full range of packages that run under **UNIX** System V. For end users it's a reference guide to the programs available. And for developers it's a smart way to ensure packages will have even greater exposure to the growing **UNIX** System V market.

To learn more about **UNIX** System V market opportunities, order the **UNIX** System V Software Catalog—at $19.95 plus tax. Call 1-800-432-6600 and ask for Operator 387.

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IBM from page 37

without any applications software.

Hooking up an IBM terminal will cost slightly under $2,000. Each additional Personal Computer requires a $995 terminal emulation package. The three-workstation configuration displayed at the announcement, which included a Personal Computer AT, came to well over $20,000.

Overall, the System/36 line offers a lot of customer blessings — they are reliable beasts, they run 4,000 programs and more than 50,000 of the systems already are in place — which often are compelling reasons for small to medium-size businesses.

But at the low end of the multiuser market where IBM's name does not count for quite so much, where price/performance is critical and where others have strong offerings, the System/36 PC will hardly be a dominant player.

Since last October, Big Blue has promoted the System/36 line as the mid-range hardware of choice for a distributed office architecture scheme, although these waters were muddied last month when IBM announced System/38 support of Office Systems software as well.

As the software components of this grand scheme appear, IBM is promoting it with newspaper ads designed to produce warm fuzzy feelings. The ads picture the System/36 "routing information all over the office faster than you can say 'Gosh, I should route this all over the office.'

"On the other hand," the ads continue, "if you need access to the facts and figures stored in your company's big mainframe computer, the System/36 is a doorway. Your personal computer plugs in one end, your mainframe in the other. And the System/36 contentedly hums away, letting you amble through the main data base just as far as your clearance will take you."

Clouds in the scenario

However, the low-end model's shotgun marriage of two architectures clouds this cheery scenario. A lot of other functions shut down elsewhere on the system while you're ambling through that data base.

Most strikingly, the personal computer directly plugged into the System/36 PC is substantially crippled, running IBM PC-DOS applications only as "a casual or secondary use," according to product material.

But despite all this, offering a small, relatively inexpensive System/36 both directly and through resellers is a good move for IBM, and many expect IBM to fix those glitches fairly promptly.

JOHN CULLINANE

On the Information Center Strategy

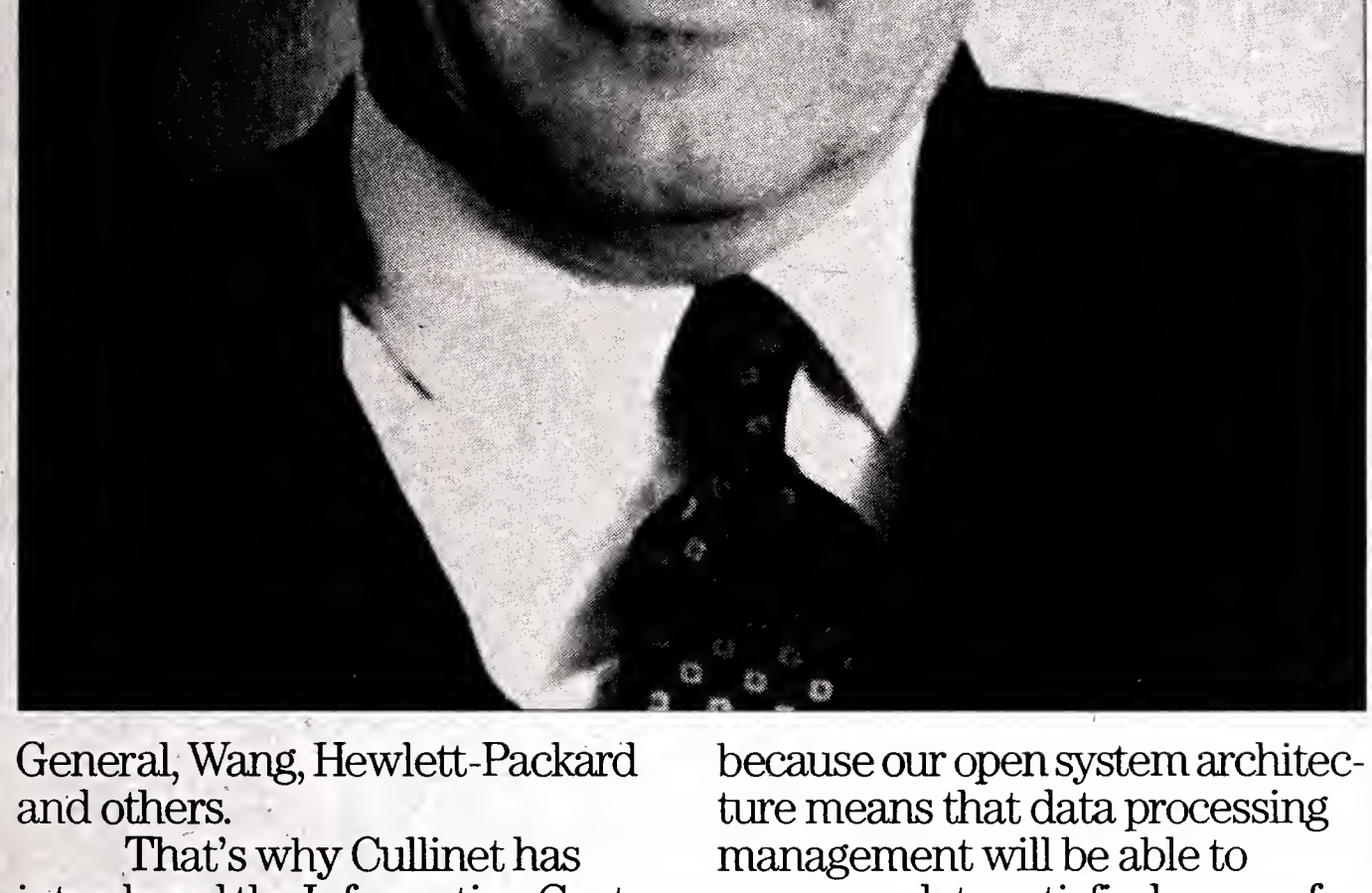
Today, virtually every IBM mainframe user is attempting to implement an information center. Formulating a successful information system strategy for the 80's and 90's requires it.

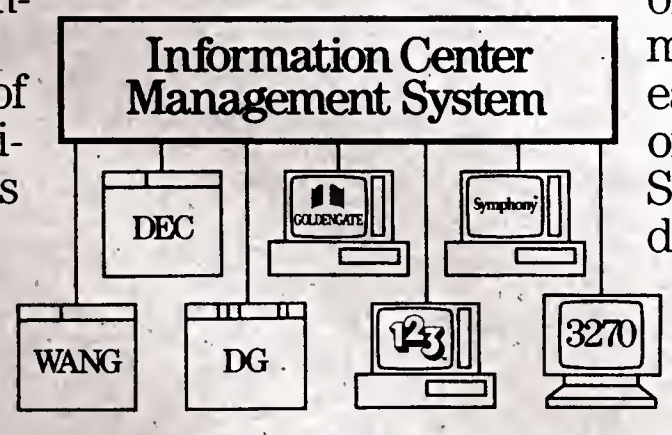
However, one of the major problems many companies face is the variety of software and databases located on different mainframes, departmental minis and personal computers. The challenge is to create an environment that integrates this diversity, is

"Open system architecture is key in implementing an information center strategy."

responsive to the corporate user community in meeting its information needs and, most importantly, provides access that is consistent and transparent. This is why open system architecture is key in implementing an information center strategy.

It also makes particular sense for a software company like Cullinet to adopt a policy of open system architecture that allows corporations to standardize on Cullinet's products without losing a significant investment in other vendors' products—whether they are mainframe applications, microcomputer software such as Lotus 1-2-3, Symphony and other PC products or departmental minis from companies like Digital, Data General, Wang, Hewlett-Packard and others.





That's why Cullinet has introduced the Information Center Management System. It's one part of a strategy that makes it much easier for the VP of Information Systems to standardize on the full range of Cullinet software, including our proven mainframe database and applications and our integrated GOLDENGATE microcomputer software.

Our strategy makes sense not only because Cullinet products are designed to work together, now and in the future; but also because our open system architecture means that data processing management will be able to accommodate satisfied users of other software while anticipating the introduction of new products.

For more information about the Information Center Management System and the full range of Cullinet products, I encourage you to phone, toll-free, 1-800-225-9930. In Massachusetts, the number is 617-329-7700.

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MICROCOMPUTERS

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disassembler for IBM Personal Computers and Personal Computer XTs that converts object code to source assembly code for Intel Corp. 8088, 8086, 80186 and 80286 microprocessors and for 8087 and 80287 math coprocessors.

The source code can be reassembled because its format is compatible with IBM's Macro Assembler and Intel's ASM-86 assembler, the vendor said. Code can be output to the terminal, printer, diskette or hard disk drive. Inside also is said to create a cross-reference table that lists each instruction that uses a particular value.

Inside costs $34.95.

Blackridge, P.O. Box 385, Bettendorf, Iowa 52722.

■ **SSI Software has unwrapped a spreadsheet program that interfaces with its Wordperfect word processing package running on IBM Personal Computers and compatible machines.**

Called Mathplan, the spreadsheet can save and combine partial worksheets, the vendor said. It reportedly provides 60 statistical, trigonometric and financial functions for building formulas and saves graphs as text files that can be included in Wordperfect documents.

Graphs are said to include vertical, horizontal and stacked-bar charts. The worksheet measures 999 rows by 64 72-char. col., the vendor said.

Mathplan costs $295.

SSI Software, 288 W. Center St., Orem, Utah 84057.

■ **Thorn EMI Computer Software, Inc. has announced two utility programs that provide preconstructed financial and statistical models for the firm's spreadsheet package, Perfect Calc. Both utilities run on the IBM Personal Computer, Personal Computer XT and AT.**

The financial utility, Perfect Finance, is said to include 30 prestructured spreadsheets for investment planning; financial statement items; capital budgeting; and cash flow, loan and personal investment analysis.

Perfect Stat, the statistical utility, offers 80 models that include parametric and nonparametric hypothesis tests and regression analyses, the vendor said.

Each package costs $50.

Thorn EMI Computer Software, 1881 Langley Ave., Irvine, Calif. 92714.

■ **Gemini Software has announced an automated hard disk drive backup program for the Wang Laboratories, Inc. Professional Computer and IBM Personal Computer.**

Called Gemini Backup, the program automatically backs up either files that have changed since the last backup or only user-designated files or directories, the vendor said.

The program is said to back up to regular or high-density floppy drives, removable hard disk cartridges or disk emulation tapes and to run in parallel with other applications packages.

Gemini Backup costs $95.

Gemini Software, 91 Sheldon St., Providence, R.I. 02906.

■ **Migent Software, Inc. has announced a business package that reportedly combines artificial intelligence functions, a relational data base manager, a file manager and a spreadsheet. The software runs on IBM Personal Computer, Personal Computer XT and compatible systems.**

Called Ad-Lib, the software automatically creates record layouts and defines fields, requires no file names and lets the user change spreadsheet size and format with cursor keys, the vendor said. Data input is said to be through forms that can be drawn free-form on the screen.

Ad-Lib costs $495.

Migent Software, Suite 203, 8300 N. Hayden Road, Scottsdale, Ariz. 85258.

■ **STSC, Inc. has announced that its Statgraphics statistical graphics system for the IBM Personal Computer line now supports IBM's Enhanced Graphics Adapter and Enhanced Color Display Monitor.**

This allows Statgraphics to provide high-resolution color graphics without giving up text and numeric display quality, according to the vendor.

The Enhanced Graphics Adapter is said to provide 640- by 350-pixel bit-mapped graphics on Personal Computer and compatible monochrome displays, 16-color support in 320- by 200-pixel and 640- by 350-pixel modes on the original IBM color display and 16-color 640- by 350-pixel resolution on the Enhanced Color Display.

Statgraphics costs $695.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

■ **Consumers Software, Inc. has announced a utility program said to improve the reliability of spreadsheet programs.**

The Spreadsheet Auditor operates with Lotus Development Corp.'s 1-2-3 and Symphony and Sorcim/IUS Micro Software's Supercalc on IBM Personal Computers and compatible machines.

Features include a flowchart utility that lists all the places a formula appears in the spreadsheet, a facility to print and cross-reference all macros used and Sideprint, a utility that prints spreadsheets and other text files sideways, according to the vendor.

The program costs $149.

Consumers Software, Suite B, 8315 Monterey St., Gilroy, Calif. 95020.

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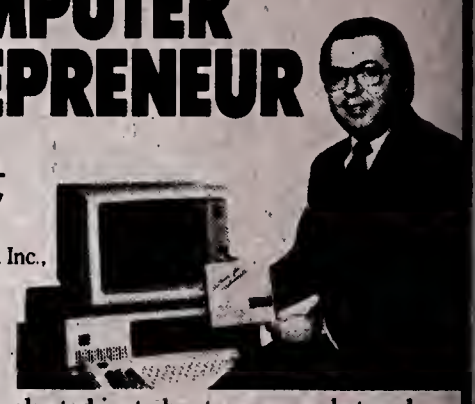

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3. COMPUTER INVOLVEMENT

Types of equipment with which you are personally involved either as a user, vendor or consultant (circle all that apply).

A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

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Technology's Expanding Horizons

July 15 -18, 1985
Chicago

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Large systems software manufacturers may not be crowding the conference floor, but they will be there to exhibit their wares/**Preview/6**

Hardware is predicted to be the star of the show, as software vendors watch from the wings/**Preview/7**

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A number of companies that appeared at last year's NCC will not show up this year because of costs and attendance at other shows/**Preview/9**

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Computer systems help keep NCC activities rolling at Chicago's McCormack Place/**Preview/33**

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COVER PHOTO COURTESY OF NASA

NCC '85: A look into the future

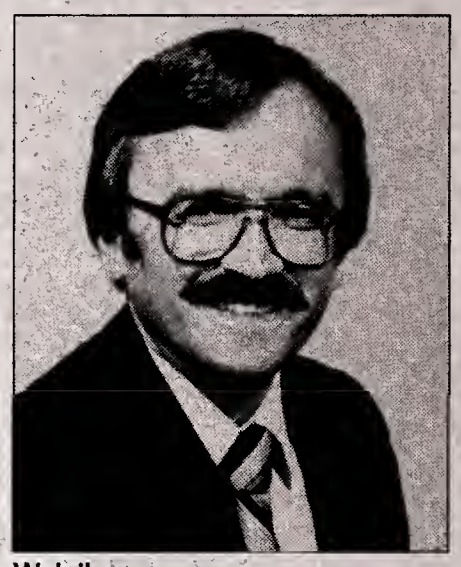
Draws together business, academic realms: director

By Clinton Wilder
CW Staff

Among the changes one notices between the 1984 National Computer Conference (NCC) program and the NCC '85 agenda is that the "Hardware and Architecture" program track has been replaced by the more elegant-sounding "Future Architectures and Supercomputers." The difference is deliberate.

"The change was a conscious decision to go along with the conference theme of 'Technology's Expanding Horizons,' " NCC program director Anthony S. Wojcik said in a recent interview.

"It's an indication of my own interests but also of what I believe are very hot topics right now. To me, NCC has a tradition of giving the people who attend it ideas about the future. Part of the mission of setting up the program was to bring back into the industry mainstream some ideas about what's going on technically," he said.



Wojcik

Wojcik has spent the last 18 months on that mission, screening nearly 200 session proposals. His success will be evident from the beginning of the conference with keynote speaker retired U.S. Navy Adm. Bobby R. Inman, chairman of Microelectronics and Computer Corp.

Future-oriented speaker

Wojcik wanted a future-oriented industry figure, and few have been as well-publicized as Inman, who is at the forefront of fifth-generation computer research.

"He fits perfectly into our theme of the future, and we had hoped we could attract someone like him," Wojcik said. "Advanced computer research today is clearly an area that interests not just the academic world but the business world as well."

Wojcik's own background spans both worlds. A professor of computer science and electrical and computer engineering at the nearby Illinois Institute of Technology, Wojcik has also served as a consultant to industry research at AT&T Bell Laboratories and the Argonne National Laboratory in Argonne, Ill. A lifelong Illinois resident, Wojcik has specialized in the fields of digital systems, computer organization and design automation.

In setting up his committee to pull the ambitious program together, Wojcik tried to draw equally from the academic and business arenas.

"The idea of NCC is to try to bring everyone together for better perspective," he said. "But it is a challenge. I've worked on several NCCs in the past and could see some problems that you face, but you don't anticipate all of them."

The scourge of NCC chairmen is the last-minute business commitment that pulls a top-notch session leader, committed more than a year before, out of the NCC city a week before the show.

Such headaches are inevitable with an all-volunteer program, but Wojcik is especially proud that three of the most future-oriented program tracks — artificial intelligence, architecture and networking (also new this year) — have remained intact.

"It is like a shell game at times," Wojcik said, "but we're particularly happy the way those three held out. In AI, for example, someone who attended all 10 sessions would come away with something pretty in depth."

Wojcik is well aware of the industry trend away from the large all-things-to-all-people shows like NCC to smaller, specialized conferences. But he believes that NCC, even with its smaller attendance, must continue to offer what it always has.

"We're serving a potentially giant market; we can't gear things just for the MIS audience or the academic," Wojcik said. "NCC gives nonexperts a chance to hear from the experts on a variety of topics, while the specialists can go to all the sessions in one program track. Some people think our focus is too broad, but we have to do it."

Wojcik also predicted a very strong attendance at NCC '85, in part because of its location in his home state.

Boats traverse the lagoon at Lincoln Park on Chicago's North Side.

NCC Preview

NCC: Still computing's greatest show on earth

By Edward Warner
CW Staff

CHICAGO — The theme of this year's National Computer Conference (NCC), "Technology's Expanding Horizons," pervades the activities and presentations scheduled for the four-day show.

The conference's July 15 keynote speech, for example, "Managing the Creation and Commercialization of Technology," will be given by retired U.S. Navy Adm. Bobby R. Inman, director of the Austin, Texas-based cooperative research and development venture known as Microelectronics and Computer Technology Corp.

The NCC conference theme is also reflected in the technical sessions. This year's conference sessions have titles that include "Future Architectures and Supercomputing" and "Artificial Intelligence."

The show's theme, according to conference chairman Karl Martersteck, reinforces the fact that the industry "is clearly a technology-driven industry, and it's critically dependent for our national success to maintain our technological leadership position." Martersteck is executive director of the Digital Switching Systems Division at Bell Laboratories in Naperville, Ill.

The show is expected to draw 80,000 people to the 400,000-sq-ft McCormick Place convention center, according to a spokesman for the American Federation of Information Processing Societies, Inc. (Afips), one of the conference's cosponsors. The following are among the special features of the conference:

■ Approximately 84 technical sessions offered in nine tracks to permit attendees to focus on areas of interest such as personal computing and computer networks.

■ Twenty-seven professional development seminars on topics ranging from "Cost-Effective System Support" to "Implementing a Methodology — Do's and Don't's."

■ More than 600 exhibitors representing more than 320 product and service categories.

■ A forum featuring films and videotapes on computer industry advances.

NCC's technical-session tracks will focus on specific aspects of computer technology. The "Future Architectures and Supercomputing" track, for example, will look at "innovative computer architectures for both numerical processing and knowledge engineering," according to that track's chairman, Kai Hwang of the University of Southern California. Within that track, sessions will be held on such topics as multiprocessor architecture, interconnection networks and supermicroprocessors.

The other tracks for the conference's technical sessions are AI, business applications, educational and societal issues, end-user computing, information systems management, networking, personal computers and software systems.

Among the more exciting technical sessions, NCC program chairman Anthony S. Wojcik said, will be IBM's presentation on Systems Network Architecture, marking that structure's 10th anniversary, and a personal computing track session on AI on the personal computer. Wojcik is a member of the computer science department at the University of Illinois.

PHOTO COURTESY OF KEE CHANG

Chicago's McCormick Place

The 27 professional development seminars, meanwhile, will focus on updating professionals on specific key issues such as AT&T's Unix operating system and the interface between DP and computer-aided design.

Registration for the seminars, to be presented at the McCormick Center Hotel across the street from the exhibit hall, costs $55 for a half-day session and $95 for a full-day session.

"Fault-Tolerant Systems" is among the seminars planned for July 15. Those for July 16 and July 17 will include "Computer Networking" and "Breakthroughs in Strategic Planning and Electronic Data Processing Management," respectively. Among the July 18 seminars will be "Information Modeling."

The conference's July 17 Pioneer Day will pay tribute to the researchers and engineers in computer science at several Midwestern research laboratories, including the Argonne National Laboratory in Argonne, Ill. Their work, a conference spokesman said, resulted in such machines as the Avida, Oracle, Ordvac and Illiac computers of the early 1950s.

At the July 15 keynote session the recipients of the Harry Goode Award and the Distinguished Service Award (DSA) will be honored. The Goode Award includes a medal, certificate and cash prize and is given to honor "outstanding contributions to the information processing services," an Afips spokeswoman said. The DSA, she said, honors the outstanding contribution of an individual to the information processing field.

Registration for NCC costs $125 in advance and $150 on-site. One-day registration is $50; student registration is $10; registration for exhibits only is $50.

Afips is located at 1899 Preston White Drive, Reston, Va. 22091.

Keynoter Inman to explore R&D's evolution into products

By Clinton Wilder
CW Staff

The process of encouraging computer research advances and turning those advances into successful products on the market will be the topic of the 1985 National Computer Conference's (NCC) keynote address by retired U.S. Navy Adm. Bobby R. Inman, chairman, president and chief executive officer of the Microelectronics and Computer Technology Corp. (MCC).

Inman will deliver the speech "Managing the Creation and Commercialization of Technology" at 9:30 a.m. July 15.

Inman, the former director of the National Security Agency and deputy director of the Central Intelligence Agency, was named MCC chairman in 1983. He is in charge of directing the flow of technology from Austin, Texas-based MCC to its 21 member companies for incorporation into their product lines.

Inman is expected to discuss the procedures by which MCC hopes to advance American computer technology, as well as to encourage cooperative joint ventures and other innovative approaches to computer research.

"The challenge is our ability to commercialize technology," Inman said in a recent interview. "In the area of defense, for example, the time period from [a new technology's] conception to commercialization used to be four to five years. Now, as a result of bureaucratic requirements and weaknesses in our support of basic research, that time period is 12 to 13 years."

Inman believes that Japan's greatest competitive edge lies not in technological superiority but in the speed with which Japanese high-tech companies have brought their technologies into the marketplace. Because MCC was formed in direct response to Japan's announced effort to build the first fifth-generation computers, its biggest challenge lies in translating research breakthroughs into products.

"The 1980s and 1990s find us in an increasingly competitive international marketplace," Inman said. "This worldwide competition, coupled with scarce resources, particularly intellectual resources, here in the U.S., have forced us to seek new ways to go about the process of creating technology."

Inman predicted that cooperative corporate ventures, of which MCC is the largest and one of the best-known, will become increasingly commonplace in the computer industry. "U.S. companies are increasingly turning to the tool of procompetitive joint research ventures," he said. "Such an approach allows an efficient use of scarce technological problems and passing the results of the research back to the individual partners, who then carry the technology competitively to the markets of their choice in products of their own conception."

Inman has spoken often of a national awareness of the need for technological innovation and is expected to stress the point again at NCC.

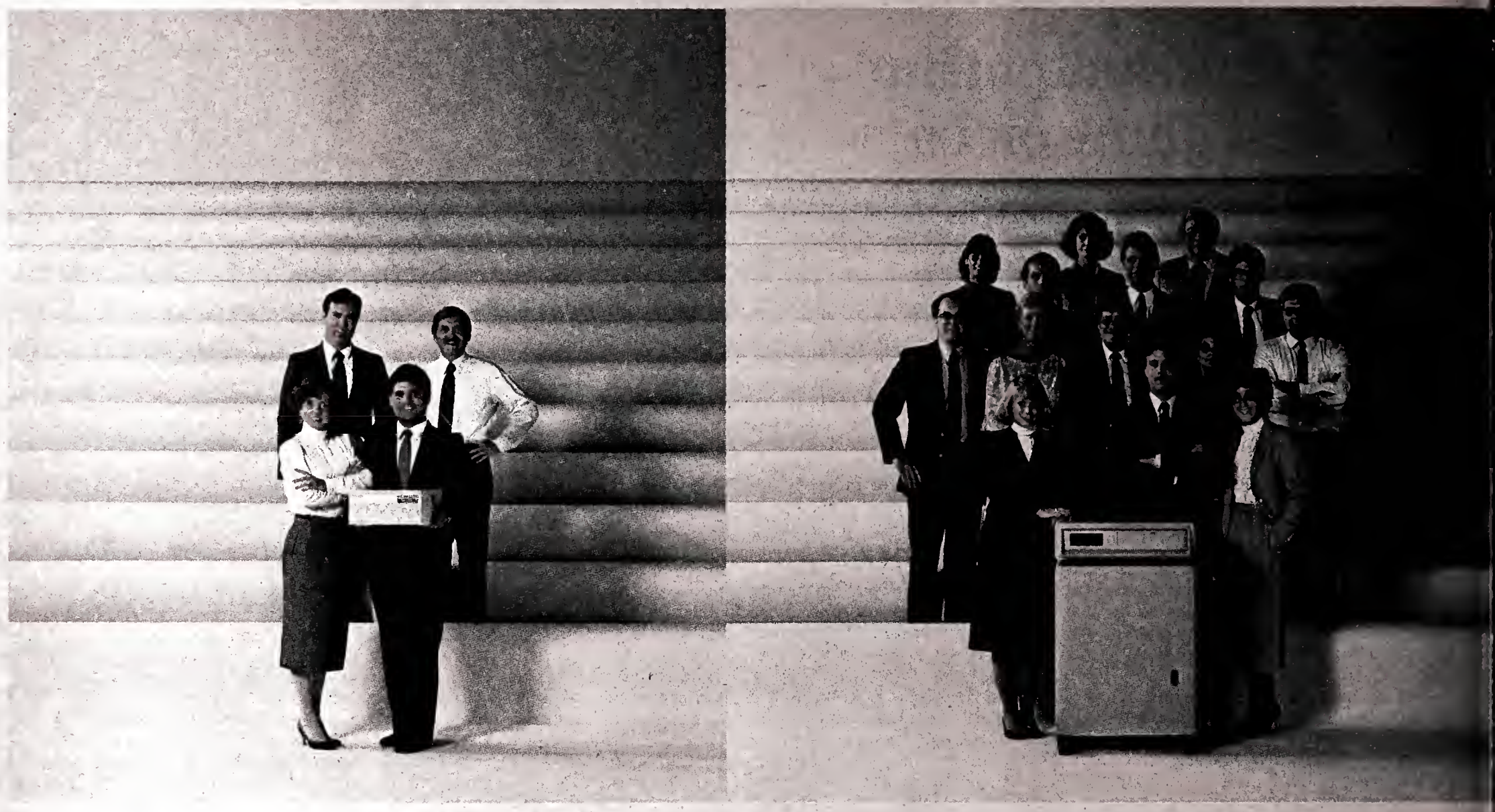
PHOTO COURTESY OF BOB DAEMMRICH

Inman

"As we revise our tax system, we must be careful not to damage the process of capital formation, vital to the supply of investment funds for new ventures," he said. "The 1981 research and development tax credit is due to expire this year. I believe that the existence of this credit was the major factor in the continued increase in R&D spending, even during the deep recession of 1982. We should not take actions that once again reduce the incentives for critical investment in research."

Microelectronics and telecommunications are two of six industries identified by the National Academy of Sciences as deserving attention to ensure the continuation of technological advancement. Inman agrees that those industries, along with aerospace, energy, materials and biotechnology, must continue to seek paths to create and commercialize new technologies.

"The viability of the cooperative approach depends on the characteristics of specific industries, and the approach is certainly not a panacea to all problems of innovation and commercialization," Inman said. "But our competitiveness in a variety of industries will depend on our ability to facilitate the emergence and merging of technology in these six industries."



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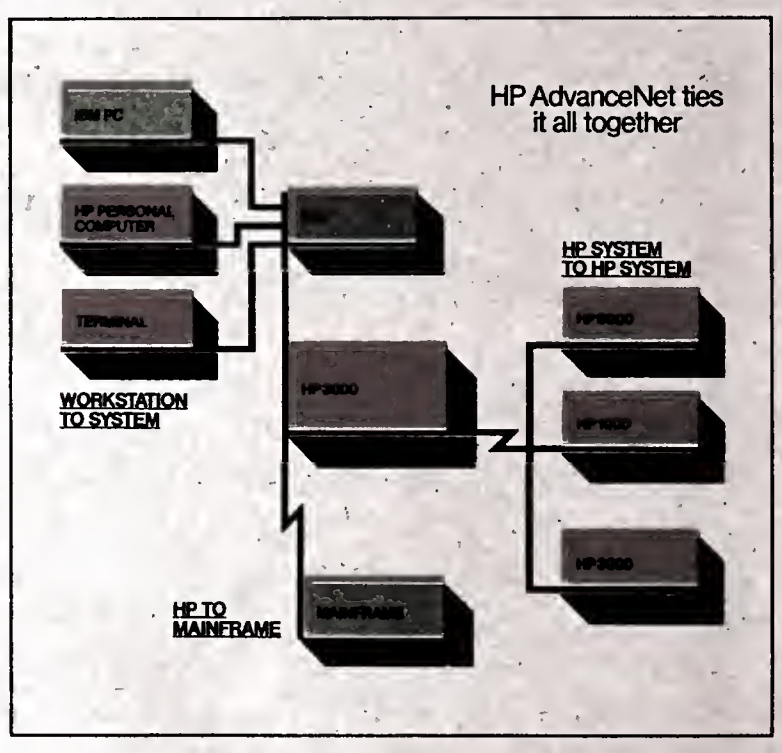

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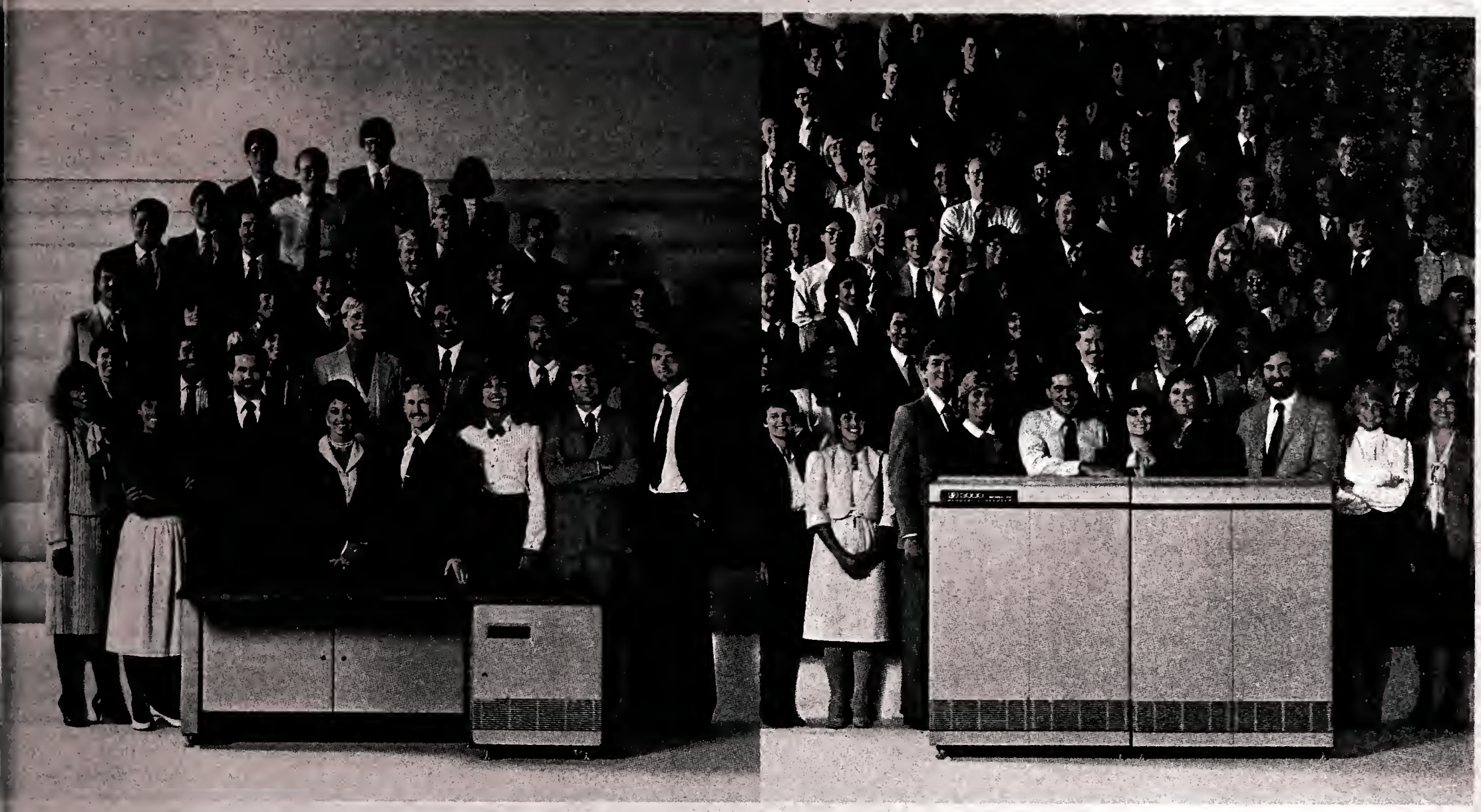

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NCC to host few large systems software vendors

But seek, and ye shall find

By John Gallant
CW Staff

You may have to search carefully through the maze of booths at the 1985 National Computer Conference (NCC), but if you are persistent, you will find the few large systems software vendors that plan to attend the annual computer industry gala.

Cincom Systems, Inc. will use its 20- by 30-ft booth to show off its major product lines, a spokeswoman said. In addition, the Cincinnati-based software vendor plans to hold a press conference to introduce products.

The spokeswoman declined to offer any specifics about the announcements but said they will involve applications software for IBM mainframes and Digital Equipment Corp. VAXs — Cincom's primary hardware environments.

Cincom was about the only mainframe software vendor to use NCC '84 as a product springboard.

Held press conference

The company staged a press conference in Las Vegas last year to introduce a Wang Laboratories, Inc. VS version of its Mantis applications development system and a set of AT&T Unix-based development tools.

Along with demonstrations of its existing products, Princeton, N.J.-based Applied Data Research, Inc. (ADR) is slated to exhibit a product that it plans to announce prior to the Chicago show.

ADR President Martin Goetz said the pre-NCC announcement will involve a micro-to-mainframe communications product and is related to the company's recent licensing agreement for Data Language Corp.'s micro-based Progress applications development system. Users can also get a look at ADR's recently unveiled [CW, May 6] DL1/Transparency migration aid at its NCC booth.

> *If you are persistent, you will find the few large systems software vendors that plan to attend the annual computer industry gala.*

An SAS Institute, Inc. spokeswoman said the Cary, N.C.-based software vendor will be exhibiting its line of software, with special emphasis on its new micro-based products.

NCC visitors will be able to see the base SAS system for IBM's PC-DOS along with the recently introduced SAS/Stat statistical and SAS/Rterm terminal emulation packages designed for IBM Personal Computers [CW, June 24].

Attendees should also look for Los Gatos, Calif.-based Britton-Lee, Inc.'s announcement of a relational data base machine geared to PC-DOS-based multiuser micros. The machine, based on Britton-Lee's Intelligent Database Machine architecture, is expected to serve as many as 100 users on a network and be priced from $50,000.

Cullinet Software, Inc. will give users a look at its recently announced Information Center Management System (ICMS) products [CW, April 1] within the confines of its 30- by 40-ft booth at McCormick Place. The ICMS tools will be demonstrated along with the Westwood, Mass.-based vendor's other mainframe and micro software.

Computer Corp. of America will be at NCC for the first time, a spokeswoman said, to exhibit its complete product line.

Other companies scheduled to attend include Oracle Corp. and Relational Technology, Inc.

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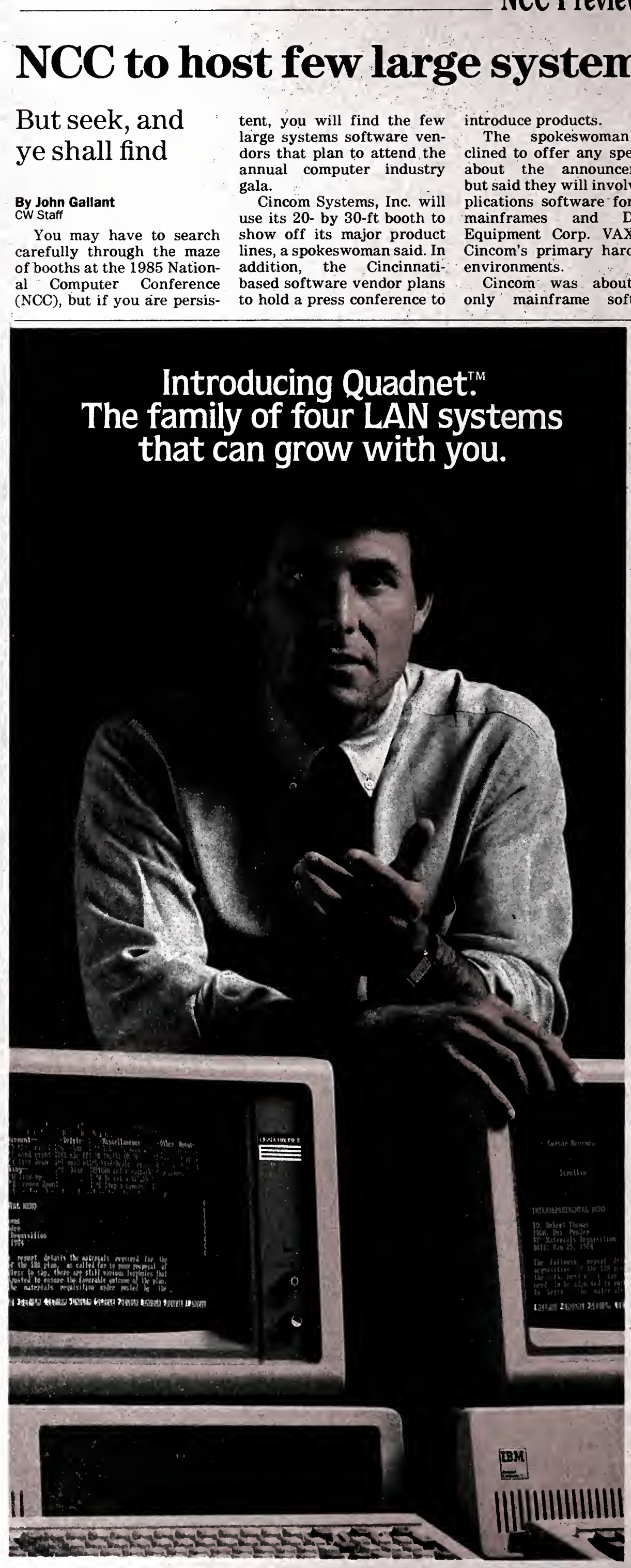

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NCC Preview

Lack of focus prompts software firms to skip NCC

By John Gallant
CW Staff

You have probably heard the old saw about the National Computer Conference (NCC) being primarily a hardware show.

The software community seems bent on proving that adage this year, as the majority of major large systems software vendors have elected to watch the Chicago extravaganza from the sidelines. Despite the health of the software industry — software vendors thus far seem immune from the forces plaguing their hardware brethren — and the impressive number of NCC '85 sessions focusing on software, the big players are, for the most part, staying home.

It seems NCC is just too vast and unfocused for software companies that are increasingly targeting their marketing resources to narrower, vertical markets or software-specific trade shows. In addition to perennial no-shows like Information Builders, Inc., Informatics General Corp., Hogan Systems, Inc. and Uccel Corp., powerhouses McCormack & Dodge Corp. and Management Science America, Inc. (MSA) decided to pass on this year's NCC. Both companies participated in the Las Vegas NCC gala last year.

As a M&D spokeswomen put it, "We canceled out this year because it is very expensive to attend and we found the results were not proportional. It's a very unfocused show and the payback is not big enough." An MSA spokeswoman said the Atlanta-based industry leader has become more selective about its trade show attendance, and NCC just did not fit the bill.

It is not that the software vendors have nothing to crow about. There have been plenty of major product announcements in recent months. But you will not get a demonstration of Uccel's Synova series or Computer Associates International, Inc.'s (CAI) CA-Unicenter software packages.

David Tory, senior vice-president at CAI, said the Jericho, N.Y.-based firm has backed off from NCC for a while. "NCC has become so enormous that we were not doing a level of business commensurate with the effort involved in trying to keep up with the Joneses, so to speak. There are a lot of tire kickers and students at NCC but not a lot of people making buying decisions."

Likewise, Software International Corp. will not be showing off its recently announced Masterpiece series products. A Software International spokesman said the company, which last attended NCC in 1983, has decided instead to introduce the products through a nationwide series of executive briefings and workshops.

If you want to learn about Software AG's planned Natural/Connection link to Ashton-Tate's microcomputer software, you will have to head to the company's Reston, Va., headquarters. Do not waste any time looking for Information Builders' booth or a demonstration of its Focus V.

IBM will be there with its System/36 PC, but a spokesman said there will be no demonstrations of the office software announced last month for the System/38. Informatics will not be showcasing its recent micro-mainframe link introductions either. An Informatics spokesman said NCC just does not offer "enough bang for the buck."

> *'We were not doing a level of business commensurate with the effort involved in trying to keep up with the Joneses, so to speak. There are a lot of tire kickers and students at NCC but not a lot of people making buying decisions.'*
>
> — David Tory
> Computer Associates International, Inc.

Other software companies that have chosen to sit out NCC '85 include Boole and Babbage, Inc.; Comshare, Inc.; Issco Graphics, Inc.; Martin Marietta Data Systems; On-Line Software International, Inc.; Execucom Systems Corp.; and Walker Interactive Products, Inc.

This year's NCC will not be totally sans software vendors. Applied Data Research, Inc.; Cullinet Software, Inc.; Computer Corp. of America; SAS Institute, Inc.; and Relational Technology, Inc. will erect booths in McCormack Place.

But Michael Gallagher, product marketing manager for Software AG, explained the views of many of his peers. "After the [Anaheim, Calif.] NCC in 1983, we said, 'No more.' It's too big. NCC is just not as productive as some of the smaller, more tightly focused shows. We're going to stick with them. We are part of a growing group of software vendors."

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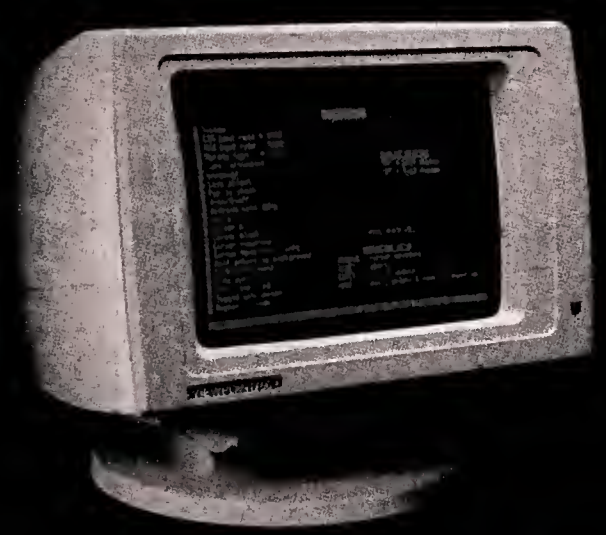

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NCC Preview

NCC past to present: A barometer of industry progress

By Paul Korzeniowski
CW Staff

The rapid progress of the computer industry has been well documented. If the space program had moved as swiftly, one might now work from an office on the moon.

Since 1973, computer professionals have gathered at the National Computer Conference (NCC) and tried to keep pace with the industry's rapid movement. To illustrate this progress, examine some past highlights.

The first National Computer Conference was held at the New York Hilton and Americana hotels in June 1973. There, IBM made its first appearance at a national data processing show since 1970 and showed its System/3 Model 10 and 370/145. Sen. Philip Hart (D-Mich.), in his keynote address, warned that the computer industry must restructure itself or face government regulation.

In national news, John Dean, former White House counsel, told a U.S. Senate committee that President Nixon, his staff and campaign aides had conspired to cover up Watergate.

Watergate was a topic of discussion at the 1974 NCC in Chicago. Vice-President Gerald Ford, the keynote speaker, warned users that computers had raised issues concerning privacy that would not be easily solved. The week of the conference, impeachment proceedings against President Nixon were begun by the House Judiciary Committee.

Product highlights in 1974 included Control Data Corp.'s announcement of plotting capability for its Cybernet time-sharing service and American Information Services' introduction of an enhanced version of IBM's VMF.

Approximately 32,000 computer professionals traveled to Anaheim, Calif., in 1975, and a *Computerworld* story stated that there was no evidence of the recession at NCC where 278 vendors displayed their wares in 799 booths. The week of the show, the government opened its antitrust case against IBM.

At the conference, CDC announced its 38500 storage system as a competitor to IBM's 3850 storage system. Other debuts centered on enhancements to the growing number of minis.

In the bicentennial year, computer enthusiasts traveled to the New York Coliseum. The show's highlight was Univac's 90/70, a mainframe which offered 542K bytes of random-access memory (RAM) that could be upgraded to 4.1M bytes of RAM. Also, Telenet Communications Corp. held the largest demonstration of a packet-switching network with 16 firms connected on its network.

When the 1977 show opened in Dallas, Billy Martin was manager of the New York Yankees ball club, which was destined to beat the Kansas City Royals and Los Angeles Dodgers on its way to a World Series victory. Personal computer manufacturers were invited to the show, but they were not allowed to demonstrate their wares on the show floor. Downstairs from the show, Mits, Inc., Cromemco Corp. and Imsai, Inc. showed their products to curious spectators.

> *If the space program had moved as swiftly as the computer industry, one might now work from an office on the moon.*

As 51,000 spectators gathered in Anaheim in 1978, a topic of discussion was passage of Proposition 13, which would limit California government spending. During the conference, Electronic Memories and Magnetics Corp. announced memory add-ons for the IBM 3030 series of mainframes.

The 1979 NCC was held in New York one week after a DC-10 plane crashed in Chicago, and 275 people were killed in the worst disaster in U.S. aviation history. Sperry Univac introduced its 1100/60 mainframe to compete with IBM's 4300 series. A major software announcement was SAS Institute, Inc. adding support for structured programming to its statistical analysis package.

Mount St. Helen's rumblings were in the news as NCC attendees met in Anaheim in 1980. During the conference, Data General Corp. brought out its Eclipse MVS-8000 line of minicomputers and Zilog, Inc. announced its Z-Net packet-switched architecture.

Systems Engineering Laboratories, Inc. demonstrated the most important product at the 1981 conference in a hotel suite and not on the show floor. The company claimed that its Concept 32/87 ran three times faster than a Digital Equipment Corp. VAX-11/780. Perkin-Elmer Corp. announced its 3230 superminicomputer that ran AT&T's Unix.

In 1982 the show was held for the first and probably the last time in Houston. The week of the conference, John Hinckley was found not guilty of shooting Ronald Reagan by reason of insanity. Microcomputer manufacturers such as Cromemco, Lobo Drives International, Jonos Ltd., Onyx Systems, Inc. and Morrow Decisions, Inc. displayed their wares.

The economy had taken a turn for the better as the 1983 NCC began in the Anaheim Convention Center. There, IBM unveiled its System/36 and NCR Corp. released seven models for its mainframe line.

In 1984, NCC moved to the Las Vegas Convention Center. A number of storage product vendors announced hard disks and tape drives. Cincom Systems, Inc. introduced a set of Unix software development tools and a version of Mantis, its fourth-generation applications development system for Wang Laboratories, Inc.'s VS line of minis.

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NCC Preview

DEC, Wang top extensive list of NCC no-shows

By Peter Bartolik
CW Staff

CHICAGO — The National Computer Conference (NCC) has long been considered a hardware show, but some equipment vendors who showed up last year will not exhibit this year. Some have found better ways to spend their money, and some are faced with the need to cut costs as a result of adverse sales conditions.

Included in the list of no-shows are Apple Computer, Inc. and Wang Laboratories, Inc., both mired in consolidation efforts as a result of abrupt financial downturns. Digital Equipment Corp. also pulled out of the show at a late date.

Apple has pulled out of several shows in the past few months, most recently canceling an exhibit at Info last month, just seven days before it opened, and yanking a session speaker at the same show with just two days' notice. That came a week before the company announced it was laying off 21% of its work force.

Wang is in similar straits, recently announcing the layoff of 1,600 workers and pledging to cut expenses across the board. A Wang spokesman, however, said the company this year has found it more advantageous to exhibit at more targeted trade shows where it can more readily identify potential customers.

DEC spokesman Richard Berube also said his company has found it more advantageous to exhibit at more focused shows, particularly the company-sponsored DECworld, where customers may spend one or two days immersed in DEC products and seminars.

"We're looking hard at where we spend our resources," Berube said.

Targeting more focused shows

The desire to focus on more finely tuned shows was cited by several vendors as the reason for passing up this year's NCC.

Tandem Computers, Inc. spokeswoman Gina Burr said, "We find we get much better attendance at a number of other vertical industry shows."

Mike Cox, a spokesman for Gould, Inc.'s Computer Divisions, said, "We just feel that the show is way too broadly focused for the industries we're in."

Texas Instruments, Inc., which has been suffering in the depths of the semiconductor sales depression and has implemented two rounds of layoffs in less than a year, will not send its data systems group to NCC this year.

Ted Jernigen, spokesman for the group, said the company is not cutting back exhibits across the board, but, instead, seeking more targeted opportunities. "We're participating in more than 100 vertical market trade shows this year that reflect the targets of all of our programs," he said.

Canaan Computer Corp., which last year used NCC to launch a new product, this year has decided there are ways to get a bigger bang for the buck. Spokeswoman Sheree Parke said, "We have been doing a lot of media advertising, and that seems to be pulling in a lot more in terms of exposure and the quality of leads. We decided to take the money set aside for NCC and pump it back into the advertising budget."

Memorex Corp. earlier this year announced it was pulling out and would instead drive an exhibit trailer around the country.

Micro-oriented firms

A number of micro-oriented companies that are skipping this year's show, including several that are no longer in business, are operating on a greatly reduced scope compared with that of last year.

Gavilan Computer Corp. filed for bankruptcy two months after last year's show and later filed a liquidation petition with the court.

Fortune Systems Corp. is struggling along under reorganization protection.

Victor Technologies, Inc. fell on hard times and was sold to a Swedish company. And Visicorp lost the marketing rights to Visicalc and was absorbed by Paladin Software Co.

Compaq Computer Corp. is still booming along, yet it also will not repeat last year's show attendance. "It no longer fits our audience profile," according to Compaq spokesman Jeff Stives, who pointed out that Compaq sells through dealers and has no direct end-user sales. Compaq is attending shows that seem most meaningful to its sales efforts, he added.

Among the other micro vendors who attended last year but were not listed on the exhibitor list received last month include Sony Corp. of America, Sord Computer Corp. of America, North Star Computers, Inc., storage device manufacturer Tandon Corp. and Corona Data Systems, Inc.

Approximately 50 vendors from last year's show will not be here this year, according to information available prior to the show. Among the missing are the following: Beehive International, which is undergoing reorganization under Chapter 11 of the Federal Bankruptcy Act; Codex Corp.; Computer Consoles, Inc.; Dataproducts, Inc.; Digital Research, Inc.; Fairchild Camera and Instrument Corp.; NBI, Inc.; Pertec Computer Corp.; and Plexus Computers, Inc.

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Schedule at a glance

SUNDAY – July 14

2:00 PM – 6:00 PM	**Advance Registration**	McCormick Place
1:00 PM	**"Career Planning Workshop"**	McCormick Center Hotel Room 5
2:00 PM – 6:00 PM	**"Early Bird Reception"**	Sauer's Restaurant, 311 East 23rd Street
3:30 PM	**Wall Street Journal Survey** The Results of the Computer/Office Automation Survey	Lindheimer North Room McCormick Place

MONDAY

Registration Hours: 7:30 AM — 6:00 PM Exhibit Hours: 11:00 AM — 6:00 PM

Program Track	10:00 AM	1:30 PM–3:00 PM	3:30 PM–5:00 PM
Artificial Intelligence	**Keynote Address** Ret. Admiral B.R. Inman, Chairman President & CEO *Microelectronics & Computer Technology Corporation (MCC)* *Arie Crown Theater*	**Microcomputer Databases That Understand English** Martha Evans *Illinois Institute of Technology* *Evers Theater*	**Computer Text Generation: Communicating in English** Kathleen McKeown *Columbia University* *Evers Theater*
Future Architectures and Supercomputers		**Multiprocesssor Architectures** John Payne *National Semiconductor* *Lohr Theater*	**Interconnection Networks** Howard J. Siegel *Purdue University* *Lohr Theater*
Educational and Societal Issues		**Hardware/Software Standards in Education: A Manufacturers' Perspective** David Sprague *Western Illinois Univ.* *Mayer Theater*	**Designing Computer-Based Learning Systems** Marilyn Ward *Western Illinois University* *Mayer Theater*
End User Computing			**Smart Buildings for Intelligent People** Thomas Cross *Cross Information Co.* *Jane Addams Room*
Information Systems Management			
Business Applications		**Business Graphics: The Experts Predict the Future** Alan Paller *AUI Data Graphics/ISSCO* *Lindheimer South Room*	**Optical and Video Technologies' Delivery Systems** D Ellen Bardes *Alltech Communications* *Lindheimer South Room*
Personal Computing			
Software Systems		**Trends in Computer Systems Technology** John Berg *Sperry Corp.* *Jane Addams Room*	
Networking		**IBM's SNA: Meeting the Challenge of Change** Edward Sussenguth *IBM Communications Products Division* *Lindheimer North Room*	**Innovation and Industry Standards: Networking Issues** Thomas Bredt *Dataquest, Inc.* *Lindheimer North Room*

TUESDAY

Registration Hours: 7:30 AM — 6:00 PM Exhibit Hours: 10:00 AM — 6:00 PM

Program Track	8:30 AM–10:00 AM	10:30 AM–12:00 NOON	1:30 PM–3:00 PM	3:30–5:00 PM
Artificial Intelligence		**Artificial Intelligence Tools in Actual Use I** James Slagle *University of Minnesota* *Evers Theater*	**Artificial Intelligence Tools in Actual Use II** Eamon Barrett *Smart Systems Technology* *Evers Theater*	**Qualitative Reasoning for Prediction and Diagnosis** Kenneth Forbus *University of Illinois — Urbana* *Evers Theater*
Future Architectures and Supercomputers	**Digital Hardware Systems** Faye A. Briggs *Rice University* *Lohr Theater*	**Supermicroprocessors** Richard Mateosian *National Semiconductor* *Lohr Theater*	**Future Generation Computers** Dharma P. Agrawal *North Carolina State University* *Jane Addams Room*	
Educational and Societal Issues				**Computers and the Handicapped I** Patricia Hutinger *Western Illinois University* *Jane Addams Room*
End User Computing	**Electronic Mail: Benefits and Challenges for the User** Stephan Durham *Cermetek Microelectronics, Inc.* *Evers Theater*		**Managing Information Centers** Henry Delevati *Information Builders, Inc.* *Lohr Theater*	**Managing Development Centers** Steven Gilman *Information Builders, Inc.* *Lohr Theater*
Information Systems Management	**Directions in Office Automation: An Experts View** Amy D. Wohl *Amy D. Wohl & Associates* *Lindheimer North Room*	**Information Systems and Competitive Advantage** M. Victor Janulaitis *Positive Support Review, Inc* *Lindheimer North Room*	**The Information Systems Executive in the 80's** John Singleton *Security Pacific Automation Co.* *Lindheimer North Room*	**Issues Facing MIS Executives in the Late 80's** Dale Lake *Wickes Companies, Inc.* *Lindheimer North Room*
Business Applications				
Personal Computing	**Top Executive View of Data Processing** Raymond Epich *Northwest Industries* *Lindheimer South Room*	**Financial Analyst View of the PC Industry** Edward Cawi *Elgin School District* *Lindheimer South Room*	**The Journalists Look at the PC Industry** Arnold Keller *Hitchcock Publishing Co.* *Lindheimer South Room*	**Microcomputer Software Testing** William Goss *International Bureau of Software Test* *Lindheimer South Room*
Software Systems	**Dialog Engineering** Adarsh K. Arora *Gould Research Center* *Mayer Theater*	**Visual Langueges** S. K. Chang *Illinois Institute of Technology* *Mayer Theater*	**Software Engineering Directives** Mario Barbacci *Carnegie-Mellon University* *Mayer Theater*	**Can We Make Programming Teams Succeed?** Annaliese von Mayrhauser *Illinois Institute of Technology* *Mayer Theater*
Networking	**The Arrival of LAN Operating Systems** Noel E. Schmidt *Architecture Technology Corporation* *Jane Addams Room*	**Communications Software for LANS** Terry R. Savage *TRW* *Jane Addams Room*		

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WEDNESDAY

Registration Hours: 7:30 AM — 6:00 PM Exhibit Hours: 10:00 AM — 6:00 PM

Program Track	8:30 AM–10:00 AM	10:30 AM–12:00 NOON	1:30 PM–3:00 PM	3:30 PM–5:00 PM
Artificial Intelligence			**Knowledge-Based Systems for Engineering Design** Duvurru Sriram *Carnegie-Mellon University* *Jane Addams Room*	
Future Architectures and Supercomputers		**VLSI Arithmetic Accelerators** Kai Hwang *University of Southern California* *Jane Addams Room*	**Innovative Computer Architectures** Jean L. Gaudiot *University of Southern California* *Lohr Theater*	**Artificial Intelligence Engines** Gerald Maguire, Jr. *Columbia University* *Lohr Theater*
Educational and Societal Issues	**Corporate Policies and Government Legislation: Support for Education** Hal Berghel *University of Nebraska* *Jane Addams Room*			**Confidentiality, Employment Agreement and the Mobile Employee** Alex A. Hoffman *Consultant* *Jane Addams Room*
End User Computing	**Choosing Application Software: The End User View** Richard Linting *Arthur Andersen & Co.* *Evers Theater*	**The Micro-Mainframe Connection** Christine Hughes *Gartner Group, Inc.* *Evers Theater*		
Information Systems Management				
Business Applications	**Computers in Manufacturing** William Rankin *Deere & Co.* *Lindheimer South Room*	**Online Transaction Processing** Armond Inselberg *Synapse Computer Corporation* *Lindheimer South Room*	**Decision Support Systems: The End User View** Ephraim McLean *UCLA Graduate School of Management* *Lindheimer South Room*	**Current Market Applications for Smart Cards, Keys and Tags** Lawrence R. Kilty *The Kilty Company* *Lindheimer South Room*
Personal Computing	**Window Management Systems: Fact or Fiction?** William Bracker, Jr. *University of Arizona* *Lohr Theater*	**Artificial Intelligence on Personal Computers** David Brodwin *Arthur D. Little, Inc.* *Lohr Theater*		
Software Systems	**Decision Support Systems** Robert W. Blanning *Vanderbilt University* *Lindheimer North Room*		**Information System Support for Engineering Applications** Peter Dadam *IBM — Heidelberg* *Evers Theater*	**Software Productivity and Maintenance** Nicholas Zvegintzov *Software Maintenance News* *Evers Theater*
Networking	**Fiber Optics in Local Area Networks** James Y. Bryce *Netserv, Inc.* *Mayer Theater*	**Digital Multiplexed Interface** Pramode K. Verma *AT&T Information Systems* *Mayer Theater*	**Networks in the Factory** Daniel Gahlon *Interactive Systems/3M* *Mayer Theater*	**PC Communications Systems** Judith Estrin *Bridge Communications* *Mayer Theater*

Special Sessions

10:30 AM-12:00 NOON	**Information Systems Technology Trends:** Richard P. Case, *IBM — Technical Personnel Development, Lindheimer North Room*
1:30 PM–3:00 PM	**Pioneer Day: The First Generation in Illinois: The Challenge, 1949-1953:** James H. Alexander *Lindheimer North Room*
3:30 PM–5:00 PM	**Pioneer Day: The First Generation in Illinois: The Impact, 1954-Present:** J. Chuan Chu *Lindheimer North Room*

THURSDAY

Registration Hours: 7:30 AM — 4:00 PM Exhibit Hours: 10:00 AM — 4:00 PM

Program Track	8:30 AM–10:00 AM	10:30 AM–12:00 NOON	1:30 PM–3:00 PM	3:30 PM–5:00 PM
Artificial Intelligence	**Applied Artificial Intelligence: Future or Fantasy?** Michele Pesta *AT&T Information Systems* *Evers Theater*	**Silicon Compilers** Daniel Gajski *University of Illinois — Urbana* *Evers Theater*	**Future of Automated Reasoning** Lawrence Wos *Argonne National Laboratory* *Evers Theater*	**Topics in Artificial Intelligence** Jackie Marsh *Motorola, Inc.* *Evers Theater*
Future Architectures and Supercomputers	**Parallel Algorithms for Supercomputers** John R. Rice *Purdue University* *Lindheimer North Room*	**Supercomputers and Their Impact on Science and Technology** George Paul *IBM Research* *Lindheimer North Room*		
Educational and Societal Issues	**Educational Delivery Systems: Use of Networks** Sylvia Charp *Past President AFIPS* *Jane Addams Room*	**Tutorial on Structure Editing: Developments in Modern Student Programming Environments** Dennis R. Goldenson *Carnegie-Mellon University* *Jane Addams Room*	**Legal Issues and Software** Steven Brower *Wood, Lucksinger & Epstein* *Jane Addams Room*	**Computers and the Handicapped II** Paul L. Hazan *Johns Hopkins University* *Jane Addams Room*
End User Computing			**Managing End User Computing** Walter Popper *Index Systems* *Lindheimer South Room*	**The Ergonomic Revolution** Howard J. MacKenzie *STAMCO Office Products* *Lindheimer South Room*
Information Systems Management	**System Development Workbenches** George Rittersbach *Peat, Marwick, Mitchell & Co.* *Lohr Theater*	**Office Systems and Workstations: Trends Today and Tomorrow** Randy J. Goldfield *The Omni Group, Ltd.* *Lohr Theater*	**Productivity Driven Office Automation** David Shay *N. Dean Meyer & Associates, Inc.* *Lohr Theater*	
Business Applications		**Security: Now and in the Future** William Bramer *Arthur Andersen & Co.* *Lindheimer South Room*		**Output Devices** Alan Sobel *Lucitron, Inc.* *Lohr Theater*
Personal Computing			**Popular Portable Computers** Rick Baker *Hewlett Packard Co.* *Lindheimer North Room*	**Keyless Data Entry & Automatic Input Technologies** Carl Helmers, Jr. *North American Technology, Inc.* *Lindheimer North Room*
Software Systems	**Software Engineering Standards: Today and Tomorrow** Laurel V. Kaleda *IBM — San Jose* *Lindheimer South Room*		**Software Testing** James Vandendorpe *AT&T Bell Laboratories* *Mayer Theater*	**Database Implementation Issues** C.R. Carlson *Illinois Institute of Technology* *Mayer Theater*
Networking	**Impact of the IBM PC Network** Gregory Ennis *Sytek* *Mayer Theater*	**Future of Networking** Norman Schneidewind *Naval Postgraduate School* *Mayer Theater*		

NCC Preview

Scientific 'gems' outshine drab hardware

By Tom Henkel
CW Staff

The continuing slump in computer sales and a round of mainframe announcements earlier this year may make it difficult to find many significant hardware announcements to savor at this year's National Computer Conference (NCC).

Vendors of scientific-oriented superminicomputers, which is one of the hot markets in a generally sluggish year, will announce a few gems, however.

Encore Computer Corp. will be showing, but not formally introducing, its Multimax multimicroprocessor mid-range system. Encore will be showing the Multimax as well as its recently introduced Hoststation 100 terminal at the National Semiconductor Corp. booth.

An Encore spokesman said the firm has yet to determine the final price and delivery dates for the National Semi 32032-based system; therefore, it is not making a formal announcement.

According to a spokesman for Pyramid Technologies Corp., it will unveil its answer to Digital Equipment Corp.'s VAX 8600, called the 90X. International Parallel Machines, Inc. will introduce another 8600 contender with what it claims is a parallel processing minicomputer, the IP-1, which is 1,000 times more powerful than DEC's VAX-11/780 in certain applications.

Some announcements early

Other companies appear to have chosen to make product announcements just prior to NCC, rather than at the show itself.

NCR Corp., for example, which introduced a version of its Tower supermicrocomputer at last year's show, made a similar announcement again this year — but two weeks before the show.

IBM, which surprised industry watchers two years ago in Anaheim, Calif., with the introduction of its System/36, enhanced the System/36 product line in a voluminous late June product announcement that also included an enhanced Model 18 of the System/38 and six terminals.

New disk drives and tape drives, which in the past two years flowed freely at NCC, will be hard to find this year. The victims of the ongoing microcomputer washout and the overall slow market, relatively few disk and tape manufacturers said they will be showing new products.

Mitsubishi Electronics America, for example, said it would announce three 5¼-in. half-height Winchester drives, and Micro Technology, Inc. will unveil a line of DEC-compatible disk controllers.

Terminals, printers to be unveiled

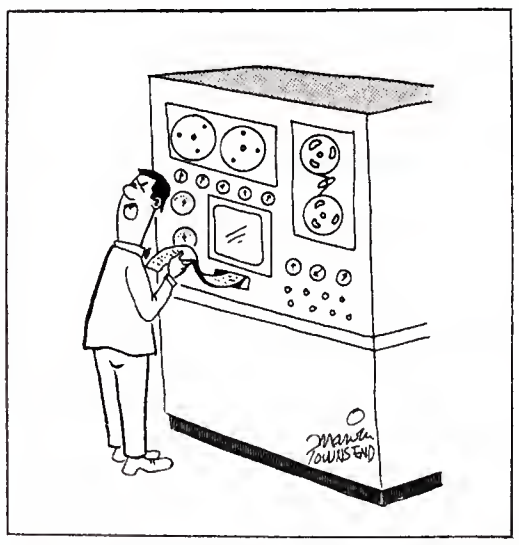
There will be a fair number of printers and terminals unveiled this year. Chinon America, Inc. will introduce two letter-quality matrix printers, the 80-col. Model 101 24-pin matrix line printer that can print at 25 line/min in a letter-quality mode and 75 line/min in a draft mode.

The company will also introduce the Model 103, an 80-col. serial matrix thermal transfer printer that can operate at 105 char./sec. in a draft mode and 35 char./sec. in a letter-quality mode.

Bell & Howell, Co. will introduce the COM Print 6000, a microfiche printing system that the company claims occupies about half the floorspace of most automated COM systems. Designed for IBM and compatible mainframe environments, the unit uses special operating software resident in host processors. The software, called BH Writer, was developed by IBM under a contract with Bell & Howell.

The usual ample supply of board-level products and power supplies will also be on hand. For example, the Sola unit of General Signal will unveil a 3-kVA uninterruptable power supply that starts at $1,245.

A Barge on the Chicago River



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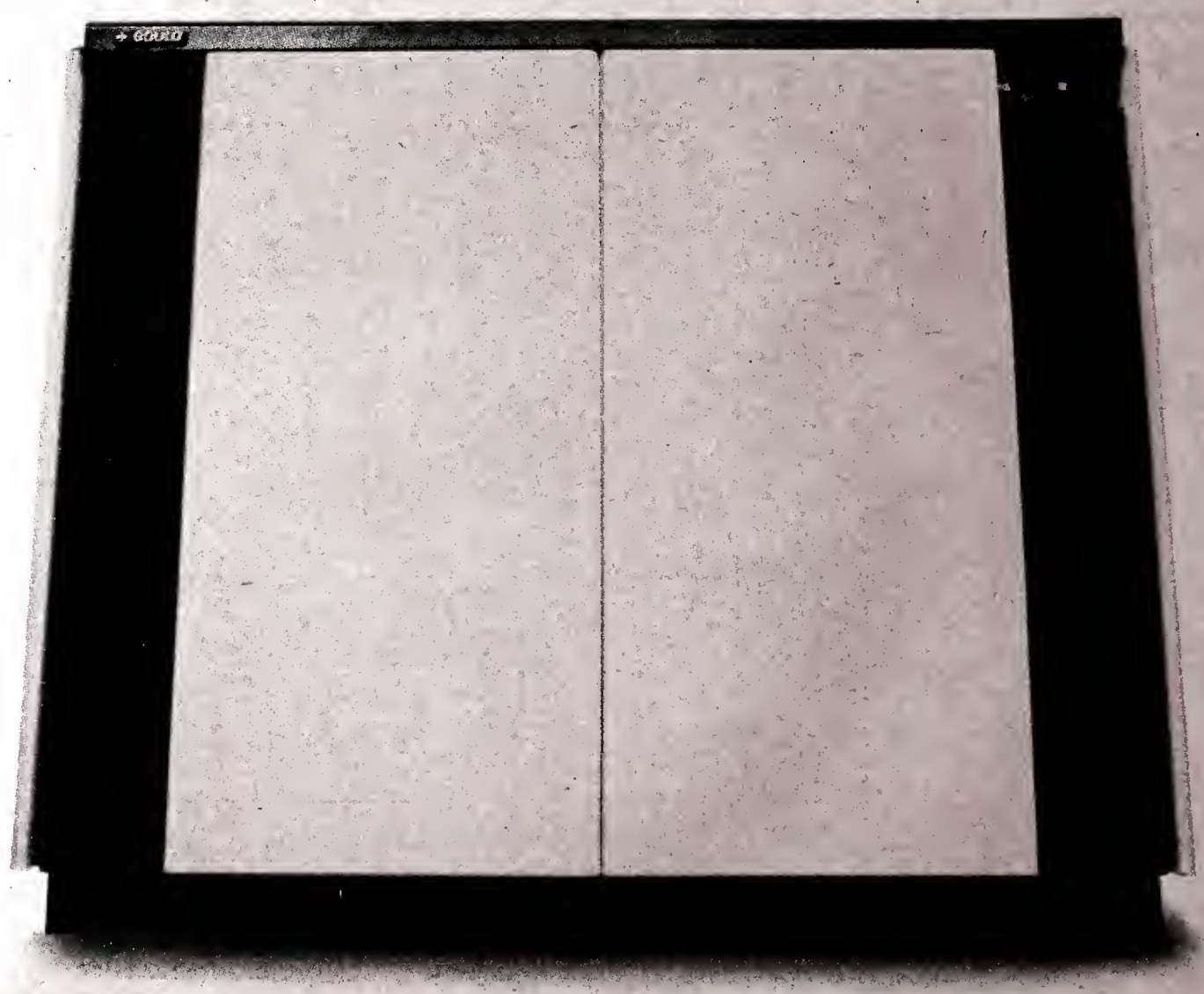

NCC Preview

Local net vendors to outnumber old guard at NCC

By John Dix
CW Staff

CHICAGO — By rough count, local-area network vendors will outnumber any other group of communications-oriented companies at this year's National Computer Conference (NCC).

Local-area net vendors coming to the Windy City to hawk their wares include 3M Corp.; 3Com Corp.; Nestar Systems, Inc.; Network Systems Corp.; Bridge Communications, Inc.; and Interlan, Inc.

There will not be a repeat of last year's show-stealing demonstration of General Motors Corp.'s Manufacturing Automation Protocol (MAP), which intended to show how products from 15 vendors could communicate over a token-passing bus local network using international standard protocols.

Only a smattering of manufacturers of modems, multiplexers, protocol converters and PBXs will attend the show. Interestingly, vendors of matrix switches, network management and control systems and data switches will be few and far-between, if any show up at all.

The demonstration has been moved to a factory automation conference later in the year. Users can catch up on some of the latest MAP developments at the Interactive Systems/3M booth.

This company will demonstrate its recently announced LAN/II, a 10M bit/sec. net that conforms to Release 2.1 of MAP. The Interactive Systems/3M network reportedly supports multiple-rate synchronous and asynchronous data links and meets both the IEEE 802.3 baseband and 802.4 broadband network standards.

Only a smattering of manufacturers of modems, multiplexers, protocol converters and private branch exchanges will attend the show. Interestingly, vendors of matrix switches, network management and control systems and data switches will be few and far between, if any show up at all.

Communications service providers will be conspicuous in their absence. AT&T Communications will have a booth, but its two closest competitors — MCI Communications Corp. and GTE Sprint Communications Corp. — will not. Nor, for that matter, will most of the major data communications network carriers, including GTE Telenet Communications Corp., Tymnet, Inc. and Uninet, Inc.

None of the divested Bell operating companies will participate in the event, although one company, Ameritech, the local telephone holding company in Chicago, will sell a mobile telephone service at its booth.

Paradoxically, while many data communications vendors will sit out this information systems show, the three largest manufacturers of voice systems will be represented. This reflects the PBX vendors' increased marketing efforts to sell the switches as hubs for office automation and data communications tasks.

AT&T Information Systems will display its recently announced Premises Distribution System (PDS), a building wiring scheme for voice/data systems. The company will also show how PDS can be used in conjunction with its mainstream local-area network product, the Information Systems Network, and System 85 and System 75 PBXs to support IBM 3270-type peripherals.

Northern Telecom, Inc. will demonstrate its line of Merridian products, including the DV-1 Data Voice System, a voice/data processing system for branch and small offices; and the SL-1 Merridian, a version of Northern Telecom's main voice switch that has been upgraded to handle more data. Both products reportedly provide digital voice/data integration over a twisted-pair wire link operating at 2.56M bit/sec.

Rolm Corp. does not have a booth of its own, but expect to see it represented in IBM's booth. The companies will display how IBM and Rolm products can coexist and how Rolm's PBX can be used to interconnect IBM devices. IBM is also expected to show products that were announced in June, including models of the System/38, System/36 PC, 3270 Personal Computer AT and a couple of graphics versions of the 3270 Personal Computer AT.

The sparsely represented, old-guard data communications vendors include Codex Corp., which will be displaying in the booth of parent company Motorola, Inc., and Timeplex Inc. Both companies will show T1 and other multiplexer products.

Many of the vendors in data communications markets reported that they are passing up NCC for communications-oriented trade shows.

MODEL	$(000)	MIPS/$
VAX 8600	575	7.6
PowerNode PN9000	400	11.7
CONCEPT 32/97	400	11.7
VAX 11/780	235	4.8
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CONCEPT 32/6730	140	12.1

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NCC Preview

Major micro vendors to skip NCC; few debuts expected

By Eric Bender
CW Staff

Important microcomputer product announcements rarely occur at trade shows these days, and this year's National Computer Conference (NCC) is expected to see relatively few significant introductions.

Most of the major players in the personal computer industry (such as Apple Computer, Inc. and Compaq Computer Corp. on the systems side and Lotus Development Corp., Microsoft Corp. and Ashton-Tate on the software side) have decided to skip this year's NCC.

There's one big exception to this trend. IBM is expected to show the Personal Computer AT, announced the month after NCC '84, and a host of other members of the Personal Computer family, including the 3270 Personal Computer AT series, which debuted last month [CW, June 24]. Related products, including the System/36 PC, also should be on display.

Televideo Systems, Inc. and Zenith Data Systems Corp. are among a handful of exhibitors planning to show Personal Computer AT-compatible systems. Other suppliers, such as Quadram Corp. and Tecmar, Inc., will highlight add-on products for the Personal Computer AT, ranging from tape backup systems to memory expansion boards.

NCC '85 also should see several debuts of laptop and portable computers, including the PC-7000 from Sharp Electronics, Inc., an upgraded model of Sharp's PC-5000 with a 25-line display.

Among supermicrocomputers on display will be the Universe 32 from Charles River Data Systems, Inc., a Versabus design said to be the first Motorola, Inc. 68020-based system to incorporate open architecture features.

Other multiuser systems based on the Intel Corp. 80286 microprocessor will be unveiled, including a version of the Compupro 286 system, built around an 8-MHz 80286 chip, from Viasyn, Inc.

Local-area network products from vendors such as Corvus Systems, Inc. and Nestar Systems, Inc. also will be much in evidence. Several software vendors like Samna Corp. will demonstrate personal computer applications tailored for network use.

> *Most of the major players in the personal computer industry have decided to skip this year's NCC.*

Also in communications offerings, NCC '85 should highlight ongoing moves toward tighter micro-to-minicomputer links, with an emphasis on products connecting personal computers with the IBM System/34, 36 and 38 series.

In other examples of the trend to connect personal computers with many other computer systems, several vendors of microcomputer applications software will emphasize their intentions to provide document interchange facilities, and Multimate International Corp. will discuss plans to move its word processing software onto the System/36 and other minicomputers.

The show also will provide an opportunity to examine much of the recent crop of microcomputer programming and applications-generation software, with products such as Micro Focus, Inc.'s VS Cobol on display.

As always, peripheral products will be out on the show floor in bewildering numbers and variations. Among these, NCC '85 should spotlight the continual improvements in price/performance for small hard disk drives. Additionally, a few optical disk drives that may be used with microcomputers will be present, early signs of a flood of optical storage products expected in the next year.

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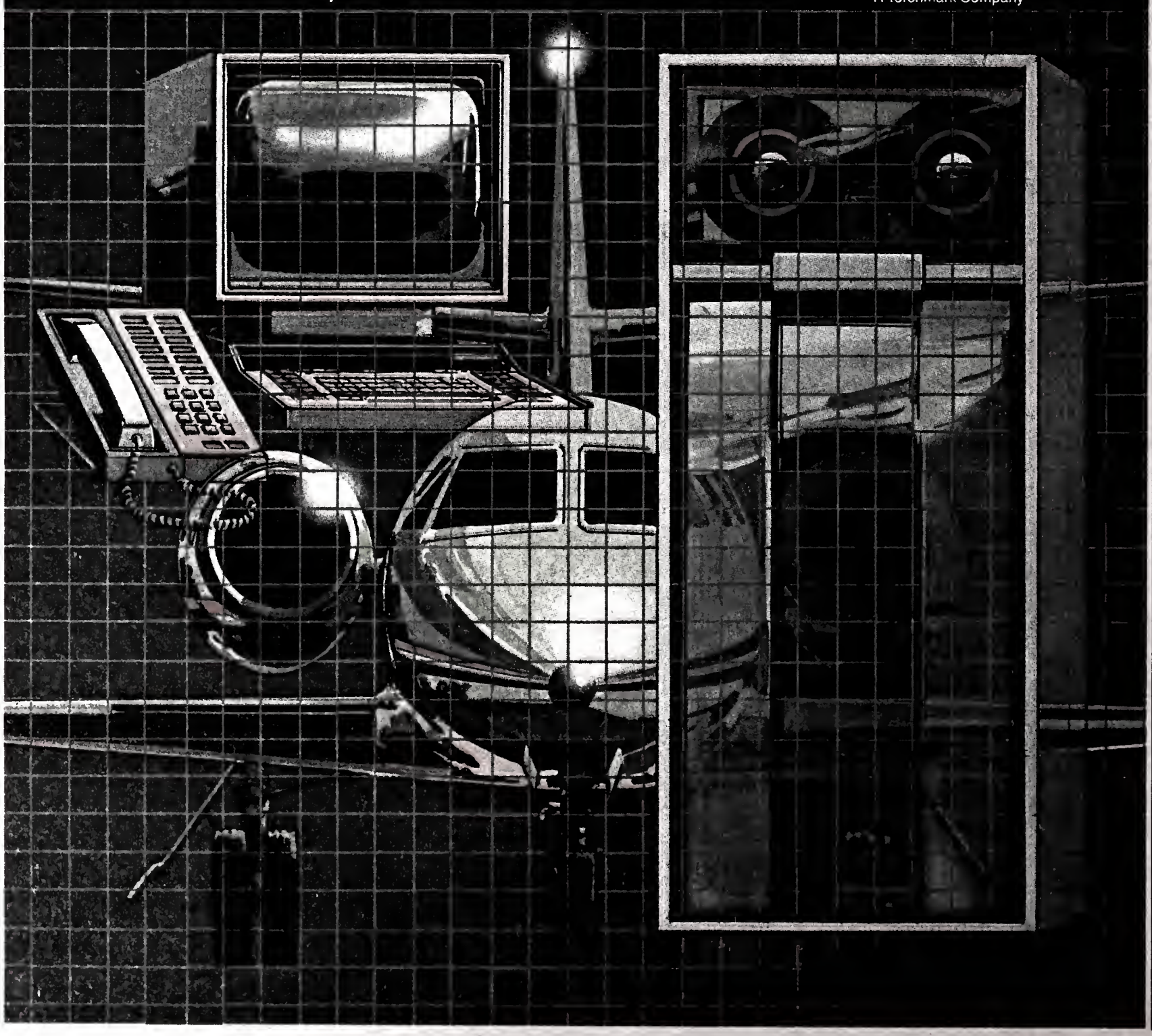

NCC Preview

System helps meat packer trim waste, beef up yield

By Maura McEnaney
CW Staff

CHICAGO — In his poem characterizing this Midwestern city, poet Carl Sandburg labeled Chicago "hog butcher for the world."

But the days of the sprawling stockyards on Chicago's South Side have long since disappeared. High transportation costs forced slaughterhouses to abandon their operations in favor of locations closer to rural production areas. Today, the wooden corrals of the Chicago stockyards stand on vacant lots.

Few meat-packing and meat-processing companies remain in Sandburg's "city of the big shoulders." One that does is the Rose Packing Co., which counts on technology as a means of survival.

The food-processing industry operates on a slim profit margin of 2% or less, which requires companies to come up with innovative processes to reduce product waste, according to Jerry Murray, Rose Packing's MIS director.

Murray said Rose Packing is the world's largest processor of Canadian bacon. The $100 million company also processes ham, sausage and bacon, supplying pork products to companies like McDonald's Corp. for packaging under private labels. Throughout this process, technology plays a key role, Murray said.

Between its Chicago plant and its Barrington, Ill., headquarters 40 miles west of here, Rose Packing uses an IBM 4331 mainframe, a System/38 and a group of IBM Personal Computer XTs and ATs for gathering data for product yield control, Murray said.

When slaughtered pork is delivered to the processing plant, information about the product type is input to the Barrington mainframe via personal computers. Data is then transmitted to the corporate office via leased lines. Proprietary software programs help Rose Packing workers determine the best use of the product and determine how to maximize yield levels, he said. "We want to get as much out the front door as came in the back door," he said.

Technology also helps the meat-packing house with its adherence to federal government regulations. The U.S. Food and Drug Administration has stringent requirements pertaining to food classifications, including restrictions on the amount of fat that can legally be allowed in particular products, Murray noted. Laboratories at the Chicago plant use personal computers to help determine quality-control levels. This involves monitoring the meat's moisture and fat content and the smoking process. The laboratory computers are also used to compose spice and flavor formulas, he said. "It's not too difficult to enhance yield and lower quality, but what we're trying to do is enhance yield and increase quality."

To protect profit margins further, personal computers at the Rose Packing plant are used to formulate ways to reduce packaging expenses, Murray said. Just as a manufacturing department uses a materials planning and control division, Rose Packing uses the older IBM 5110 and 5120 systems and proprietary software to determine the best method of deboning the pork prior to processing.

Aside from its manufacturing applications, Rose Packing uses an array of business applications to keep a careful eye on its profit margins. "We have to close the books every seven days," he said.

With an MIS department of only six doing all the programming, development and systems operations for the Rose Packing plant, there is more than enough work to keep Murray and his staff busy. "This place spins like a top," he said.

AP/WIDE WORLD PHOTO

The Chicago stockyards in busier times

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Multiplan on a PDP-11?
WordStar on a VAX?
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PertMaster on a PRO?
Palantir on a VAX?
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NCC Preview

Chicago exchange's systems keep pace with trading

By Mitch Betts
CW Washington Bureau

Down in the crowded trading pit of the Chicago Mercantile Exchange, arms are flailing and voices are shouting in a language of "buy and sell." This high-energy, fast-paced form of bedlam goes on from 7:30 a.m. to 3:15 p.m. each business day.

It results in an average 185,000 futures contracts being sold daily for a host of items, from pork bellies to foreign currencies. (A futures contract is an agreement to buy or sell something in the future at a price agreed upon today; the pork bellies almost never change hands.)

According to Vince Ambrose, a broker at the exchange for Heinold Commodities, Inc. of Chicago, millions of dollars can ride on a single transaction, and seconds count. Traders need quick access to price information, he said.

"The transmission needs to be almost instantaneous," Ambrose said. "And it is pretty good, pretty fast." Traders and brokers at the exchange can see the price data in a variety of ways: on the digital displays on the big board, on the 300 terminals on the trading floor, on the closed-circuit television system or from quotation vendors.

To keep up with the trading action, the exchange uses three IBM 4341-12 mainframes and nine Series/1 minicomputers, according to Don Serpico, the exchange's MIS vice-president.

"We have people in the pits who listen to the trading," Serpico explained. "They talk on walkie-talkies up to a balcony. And on the balcony we have about 80 terminals, where people [can key in the data] to the Series/1s." He said the Series/1s send their output to the big boards and the various localized video displays.

The 4341-12s are used by the exchange for administration and clearinghouse functions. After trading ends, the exchange's data (from the Series/1s) and data from the brokerage houses are transmitted to the 4341-12s to be reconciled, and the data base is updated.

Serpico said the floor terminals feature a system called Merc Quote, which enables traders to make queries of the trading system, such as "What were the prices from 9 a.m. to 9:30 a.m. today?"

The closed-circuit television system, with 28 stations, permits brokers in the exchange's 40-story office building to get trading information without having to be on the trading floor or buy expensive equipment, Serpico said.

"They can buy a black-and-white television, turn to a certain channel and see cattle prices," he said.

Serpico said his MIS staff of 91 is facing some major challenges, with a full plate of new projects. High on the list is a two-year project to migrate from the Series/1s to Tandem Computer, Inc. fault-tolerant units.

"We needed equipment for our very critical trading floor system that has to be up at all times," he explained. "Tandem offers a fault-tolerant concept that we felt was the best fit for us."

The exchange moved into its new building at 30 S. Wacker Drive just 18 months ago after outgrowing its 10-year home at 444 W. Jackson Blvd.

NCC telephone preregistration aims at reducing lines

CHICAGO — National Computer Conference (NCC) registration is just a phone call away in 1985.

The latest effort of the American Federation of Information Processing Societies, Inc. (Afips) to reduce the long lines that traditionally mark the beginning of NCC is to offer registration by telephone with a major credit card.

Prior to July 11, the number to call is toll-free, 1-800-NCC-1985, an Afips spokesman said. From July 9-13, from the hours of 9 a.m. to 8 p.m., conference-goers can register by calling 312-567-8000.

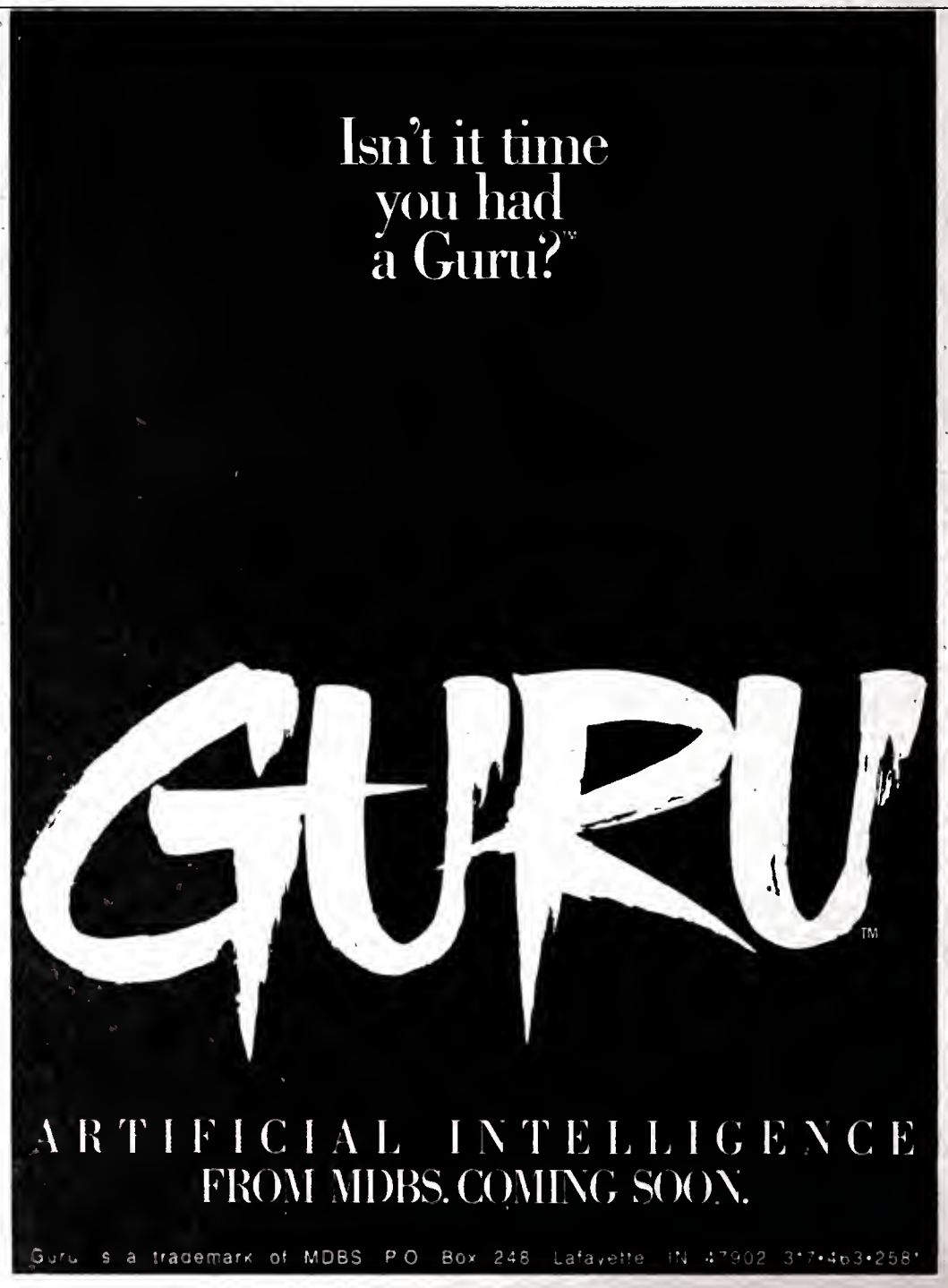
At the conference, early registration is offered on Sunday, July 14, from 10 a.m. to 8 p.m. From July 15-17, registration hours are from 7:30 a.m. to 6 p.m.; on July 18, registration is from 7:30 a.m. to 3 p.m. Those registering for Professional Development Seminars can make one stop for both conference and seminar registration, at Level 7 of McCormick Place or the McCormick Center Inn during registration hours.

A party for early-bird registrants is planned at Sauer's Restaurant, 311 E. 23rd St., from 2 p.m. to 6 p.m. on Sunday, July 14. Admission is with a conference badge.

While Afips is predicting a strong turnout of 80,000 at this year's conference, the spokesman said early registration has been heavy. Early registrants are sent through separate lines to pick up their conference materials and preprepared badges.

Color-coded signs will guide attendees to proper registration lines. Blue signs point to on-site registration; red signs point to exhibitor and guest registration; and grey signs are for those registered in advance.

The advance registration fee is $125; on-site registration costs $150.



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COMPAQ doesn't make compromises. That's why we're still making history.

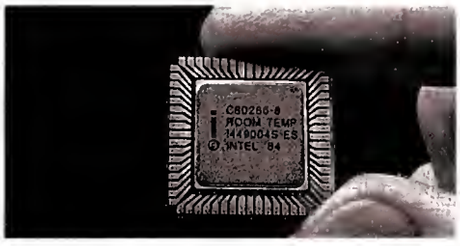
COMPAQ

Presenting the most capable

No other computer company has ever grown as fast as COMPAQ, because no computer company makes computers as powerful, as complete and as useful as COMPAQ. That's why the original COMPAQ Portable, COMPAQ PLUS,™ and COMPAQ DESKPRO™ became worldwide best sellers overnight. Now COMPAQ is introducing two new computers that advance the state of the art even further. While the original COMPAQ products remain cost-efficient cornerstones of business and professional use, especially for first-time buyers, the new products represent the utmost in performance for second-time buyers, or anyone who needs exceptional power and speed.

Triumphs of advanced technology

The new COMPAQ PORTABLE 286™ and COMPAQ DESKPRO 286.™ Advanced technology puts them in a class all their own. With power, performance, speed, and expandability that exceed even the IBM® Personal Computer-AT.™ They represent a new standard that makes others look like what they are—the products of compromise. In fact, the new COMPAQ 286 Personal Computers can be considered the most useful in the world.



The new 80286 "chip" in COMPAQ 286 Computers processes data faster.

Power with a bonus—portability

The COMPAQ PORTABLE 286 redefines portable computers. We gave it power to match IBM's most powerful desktop computer, the IBM PC-AT. Then we designed it to run all the popular programs and hardware designed for the IBM PC-AT. But we didn't stop there. COMPAQ pushed the technology further.

The COMPAQ PORTABLE 286 runs 30% *faster*. It can give you up to 20 Megabytes of internal fixed disk drive storage. And can come with features to make it even more useful. Like our *internal* fixed disk drive back-up system that protects 10 Megabytes of information on a single, pocket-sized tape cartridge.

But the most amazing thing about the COMPAQ PORTABLE 286 is that all these features come attached to a handle.

Our most advanced desktop computer

Like the COMPAQ PORTABLE 286, the new COMPAQ DESKPRO 286 runs all the popular programs designed for the IBM PC-AT, 30% *faster*. And it can also come with our convenient *internal* fixed disk drive back-up system for added data protection.

But we didn't stop there. We weren't content to compromise. We wanted to make the new COMPAQ DESKPRO 286 a more powerful, more efficient stand-alone personal

personal computers in the world

computer, as well as a faster, more powerful, more useful file server. So we gave the COMPAQ DESKPRO 286 far more memory and storage capacity—over 8 Megabytes of RAM and 70 Megabytes of high-performance fixed disk storage.

The legends continue

Not everyone will need the extra performance of the newest COMPAQ Computers. That's why we built our original line to last a long time.

These workhorses—the COMPAQ Portable, COMPAQ PLUS and COMPAQ DESKPRO Computers — are essential to many professional and business users. They run thousands of industry-standard programs developed for the IBM PC and PC/*XT*.™ They're indispensable tools in use on all seven continents (yes, even the South Pole!).

Above all, no compromises

The unprecedented success of COMPAQ came as no accident. While others built limited computers, COMPAQ built expandable computers.

While others took two screens to display high-resolution text and graphics, COMPAQ was the first to do it on one.

While others were looking for ways to cut corners, COMPAQ looked for ways to eliminate downtime by building the most rugged, reliable computers in the world.

The COMPAQ commitment to a philosophy of "no compromise" made the COMPAQ Portable and COMPAQ PLUS the world's best-selling 16-bit portable personal computers. In 1983 COMPAQ sold $111 million worth of computers to achieve the most successful first-year sales of *any* company in American business history.

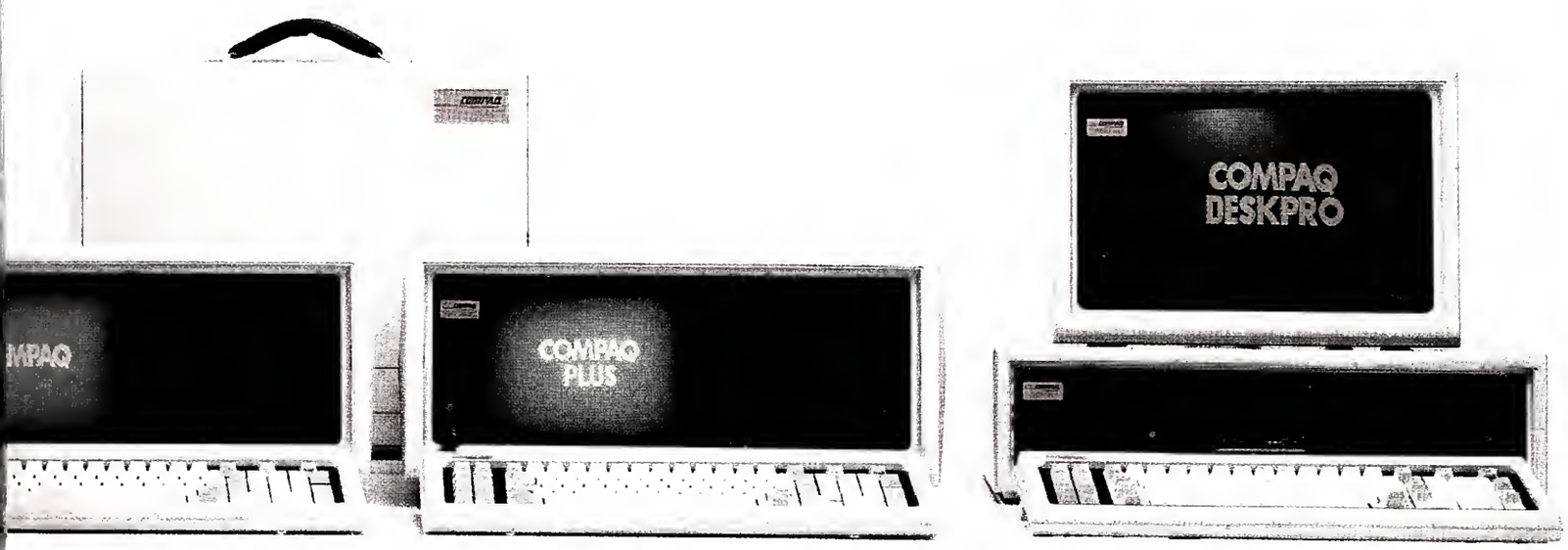
In 1984, we introduced the COMPAQ DESKPRO. In only four months, it became the second-best-selling 16-bit desktop business system in U.S. retail computer stores. And as a result, we've concluded the most successful second year of any computer company, with sales of $329 million.

The reason for this success is simple.

COMPAQ computers have been recognized worldwide. Awards include:

- *COMPAQ PLUS selected and voted Europe's 1984 Computer of the Year in the portable category.*
- *COMPAQ PLUS voted by readers of PC WORLD as their favorite product in its category in the "1984 World Class PC Contest."*
- *COMPAQ PLUS selected as the first-place winner in its category in the Creative Computing Top 12 Computers of 1984 Awards.*
- *COMPAQ Portable rated best personal business computer in overall user satisfaction by the Yankee Group market research firm opinion poll.*
- *COMPAQ DESKPRO named by PC Week magazine as one of the top ten products of 1984.*

We offer people personal computers that simply work better. And make no compromises doing so.



Introducing the new COMPAQ PORTABLE computer helps you

Anyone can make a portable computer. But to make one that runs all the popular programs designed for the IBM PC-AT, 30% faster—in a package almost half the size—was no small challenge. But one COMPAQ welcomed.

Go faster, go further

The COMPAQ PORTABLE 286 is paced by the advanced technology of the 8-MHz, Intel 80286 microprocessor. This advanced technology has numerous advantages. One advantage is the flexibility to work with several different operating systems so you're not forced to choose a personal computer solely on that basis.

The advanced capabilities of this microprocessor become even more apparent when you run complex programs. You can operate as part of a network. Or you can operate more than one program at the same time using multi-tasking software like IBM TopView.™ And you can handle the most difficult problems with breathtaking speed.

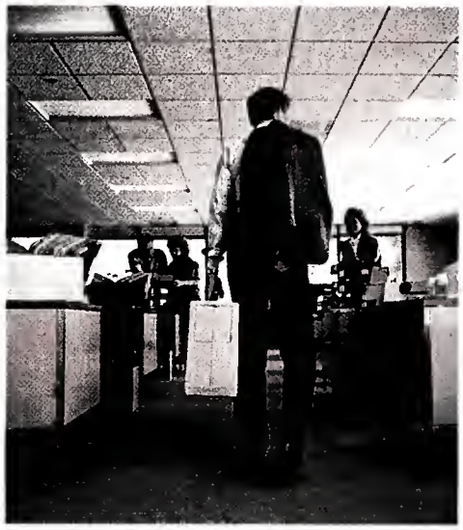
For many scientific and engineering programs you have the ability to add an 80287 coprocessor, which offers even more speed.

Both offer dramatic speed increases over earlier microprocessors. The faster response time means less waiting, and more productivity.

Power in a package

The COMPAQ PORTABLE 286 has the power of the IBM PC-AT. But the IBM PC-AT doesn't have a handle. Ours does. So it goes where you go. Works where you work. Whenever and wherever necessary. And it's easy to share with co-workers.

That's full-function portability, pure and simple.



A COMPAQ PORTABLE 286 can leave the office when you do. Take your work wherever you go.

Expandability without getting bigger

All the devices that increase the capabilities of the COMPAQ PORTABLE 286 go on the inside—not the outside—of the computer.

You can get it with one or two half-

286. Our fastest, most powerful portable do more – anywhere.

height 1.2-Megabyte diskette drives. Although they can "read" diskettes formatted for 360-K byte diskette drives, they cannot "write" to them. Therefore, as an option, COMPAQ offers a 360-K byte diskette drive to let you exchange data with other industry-standard personal computers.

There's an additional slot for a 20-Megabyte fixed disk drive. All COMPAQ Portable Computers offer fixed disk drive systems that fit *inside* the computer.

Another of our options: An *internal* fixed disk drive back-up system keeps a safety copy of your work, reducing the chance of losing your data. COMPAQ pioneered the system first in desktop computers, and now in portables.

The COMPAQ PORTABLE 286 even comes with a security lock feature that locks "on" to prevent interruption of a file transfer, or "off" to deny access to confidential information.

Because it's a portable, self-contained unit, the computer can be easily stored away after use.

Two data protection features from COMPAQ: an internal fixed disk back-up system that stores data on tape cartridges, and a security lock for locking keyboard access to your system on or off.

Who can use it?

If you're an experienced user, you may be ready to upgrade your current equipment. The COMPAQ PORTABLE 286 gives you the latest technology.

For some, power is all-important: Speed, performance, and the ability to handle the most powerful software. All are leading qualities of the COMPAQ PORTABLE 286.

Starting a business? The COMPAQ PORTABLE 286 has tremendous data base capabilities to help you keep track of your inventory, your customers, your employees, your finances. Its exceptional storage capabilities make it ideal for the complexities of accounting. Its exceptional speed means greater networking ability. Its tremendous power enables you to get the edge on the competition.

In addition, large corporations can place several of these computers with field representatives to provide clients immediate information on current prices, product availability, even shipping dates and routing. So delivery shortages can be anticipated and avoided.

The COMPAQ PORTABLE 286 can also travel within the company. From office to office. Desk to desk. From accounting, to marketing, to research.

It's powerful and versatile enough to do almost any job. Light enough to carry. And tough enough to survive lots of users.

Established reliability

Despite its newness, the COMPAQ PORTABLE 286 is in many respects a proven product. It's based on the rugged, reliable design of the original COMPAQ Portable and COMPAQ PLUS. Many of the construction techniques like cross-bracing components and shock-mounting disk drives are identical. All of which goes to prove our point: No other portable computer can measure up to the advanced power and potential of the uncompromising COMPAQ PORTABLE 286.

The COMPAQ PORTABLE 286 Specifications

Processor: 16-bit 80286; 6 or 8 MHz clock speed. **Software:** Fully compatible with all major software applications written for the IBM PC-AT. **Expansion Slots:** 3 available slots in base configuration. **Memory:** 256-K bytes RAM, expandable to 2.6 Megabytes. **Storage Devices:** 360-K byte or 1.2-Megabyte diskette drives, 20-Megabyte fixed disk drive, fixed disk drive back-up (10 Megabytes per tape). **Interfaces:** RGB color monitor, RF modulator, composite video, parallel printer, and asynchronous communications interfaces. **Keyboard:** Standard IBM PC-AT layout (84-key). **Display:** 9-inch diagonal green monochrome dual-mode monitor, high-resolution text characters, high-resolution graphics. **Security:** Locks in operating and non-operating mode to prevent unauthorized keyboard access. **Physical Specifications:** 20″W x 8½″H x 16″D. **Options:** Technical reference guide, MS-DOS™/BASIC Version 3, 512/2048-K byte memory board.

Introducing the new COMPAQ DESKPRO 286. offers more expansion,

The capabilities of the new COMPAQ DESKPRO 286 represent a personal desktop computer as practical as it is technically advanced. Plus, it maintains compatibility with the IBM PC-AT.

Utmost expandability

That's no exaggeration. The COMPAQ DESKPRO 286 can expand to give you massive storage and memory.

Without clutter. Expansion is *internal.*

It comes with a single, half-height, 1.2-Megabyte diskette drive. You can add a second drive of the same capacity, or a 360-K byte diskette drive so you can exchange information with other personal computers.

For fixed disk storage, an internal 20-Megabyte system is available. You can also choose a 30- or 70-Megabyte high-performance internal fixed disk drive sytem. The storage capacity of each is equivalent to 10,240, 15,360, or 35,840 pages of double-spaced data.

One expansion board works with all the fixed disk drives. When you upgrade to a larger fixed disk storage system, a new board is not required.

To back up data, use the COMPAQ internal fixed disk drive back-up system. It's also a safe and convenient way to store information for record keeping.

Hardworking, networking

Alone, the COMPAQ DESKPRO 286 is a tremendously useful computer. It doesn't limit you to using software under any one operating system. It runs all the popular programs designed for the IBM PC-AT. It can be configured for advanced color graphics display using a color monitor and the IBM Enhanced Graphics Adapter.

Our most powerful desktop personal computer. more speed and more flexibility.

An enhanced keyboard layout, with shift keys in easy reach for touch typists, is standard on the COMPAQ PORTABLE 286 and COMPAQ DESKPRO 286.

The modular design of the computer also lets you configure RAM and storage to the exact needs of any individual. So you never have to buy more computer than you need. Or worry about obsoleting your investment because you bought less computer than you need.

The COMPAQ DESKPRO 286 also makes the ideal hub of a local area network. Using networking packages, your computers (and your people) can share information and software, and can communicate with one another. With 70 Megabytes, the COMPAQ DESKPRO 286 becomes a powerful, high-performance file server. You can store lots of data, as well as store several programs you can run simultaneously when using software programs like IBM TopView. Your computer will perform at lightning speeds. And other configurations can make economical "nodes" of the network.

A fixed disk can store enough programs and data to handle all the accounting for most businesses.

Where to start

The flexibility of the COMPAQ DESKPRO 286 allows you to begin at any level of computing power and reach beyond the IBM PC-AT.

You can use your computer for writing extensive documents, preparing professional graphics for presentations, and for doing complicated financial studies. Chances are, however, you'll not want to stop there. You'll discover new ways for streamlining your work. You'll want to do customer lists, accounting tasks and business taxes, product inventory, annual sales projections on spreadsheets. You have the option of adding a second diskette drive, a fixed disk drive, more memory, even a fixed disk drive back-up system. All are available and can be added to the inside of your COMPAQ DESKPRO 286—easily, affordably, without losing your initial investment in hardware, software, or training.

A proven heritage

The COMPAQ DESKPRO 286 is of tested lineage. It has many of the reliable construction and design qualities of the COMPAQ DESKPRO. It has further conveniences like a dual-function security lock to prevent unauthorized access. As well as greater performance, power, and speed. The COMPAQ DESKPRO 286 stretches the limits of personal computing—with no compromises.

The COMPAQ DESKPRO 286 Specifications

Processor: 16-bit 80286; 6 or 8 MHz clock speed. **Software:** Fully compatible with all major software applications written for the IBM PC-AT. **Expansion Slots:** 5 slots available in base configuration. **Memory:** 256-K bytes RAM, expandable to 8.2 Megabytes. **Storage Devices:** 360-K byte or 1.2-Megabyte diskette drives; 20-(half-height), 30-, or 70-Megabyte fixed disk drives; fixed disk drive back-up (10 Megabytes per tape). **Interfaces:** RGB color monitor, RF modulator, composite video, parallel printer, and asynchronous communications interfaces. **Keyboard:** Standard IBM PC-AT layout (84-key). **Display:** 12-inch diagonal green or amber dual-mode monitor, high-resolution text characters, high-resolution graphics. **Security:** Locks in operating and non-operating mode to prevent unauthorized access; cover lock to protect internal components. **Physical Specifications:** System unit—19.8″W x 6.4″H x 16.5″D, Keyboard unit—18.0″W x 1.5″H x 7.0″D, Display unit—14.75″W x 10.25″H x 13.75″D, Weight—57–64 lbs., depending on configuration. **Options:** MS-DOS/BASIC Version 3, Tilt & Swivel Monitor Stand, Desk-Saver, Technical Reference Guide, 512/2048-K byte memory board.

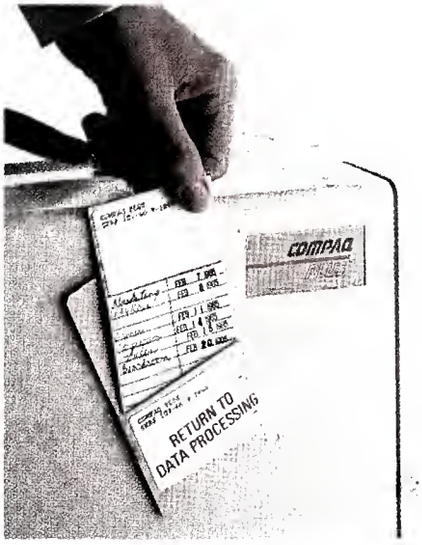
COMPAQ makes full-function portability a full-fledged reality.

If you're anxious to put a computer to work for you, but don't need the extra power and added performance of our most advanced portable computer, we have the answer.

Lots of software, lots of uses

The COMPAQ Portable and COMPAQ PLUS are based on the 8088 microprocessor, one of the most popular computer technologies, so software is abundant. Integrated business programs, personal productivity, learning tools, even educational thoughtware to sharpen your business skills. Literally thousands of programs, compatible with the IBM PC and IBM PC/*XT*, will run on the COMPAQ Portable and COMPAQ PLUS.

Many businesses put the COMPAQ Portable or COMPAQ PLUS to work as a full-time computer for part-time users. Carry it from desk to desk. Office to office. Let several people use it for one or more hours a day. Or one person use it a few days a week.



Many companies use a COMPAQ Portable as a full-time computer for part-time users.

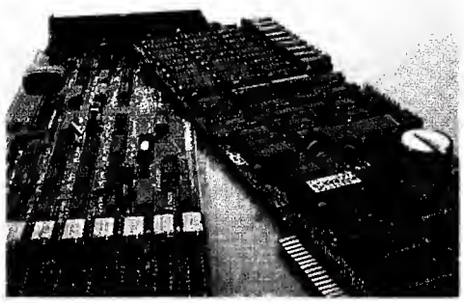
For heavy users, a COMPAQ Portable or COMPAQ PLUS can become a "second computer" for computing power away from the office.

With their rugged, uncompromising construction, they're built tough enough to pass around—something that's impractical to do with desktop computers. And because you stretch its use, you stretch your budget as well.

If you need more, it does more

How can one computer be so versatile?

One reason is the ability of the COMPAQ Portable to become a COMPAQ PLUS with the addition of a 10-Megabyte fixed disk drive. This expands storage capacity to the equivalent of 5,120 double-spaced pages of information.



Expansion boards let you add memory and extra functions inside, not out.

There are other ways to improve on your COMPAQ. Hundreds of industry-standard expansion boards are available. They fit neatly inside your COMPAQ. So you can run more advanced programs. Communicate over telephone lines. Network with other computers.

It's this kind of versatility and ease of use that makes COMPAQ Personal Computers second to none.

SPECIFICATIONS

The COMPAQ Portable

Processor: 16-bit 8088, 4.77 MHz clock speed. **Software:** Fully compatible with all major software applications written for the IBM PC/*XT*. **Storage Devices:** One or two 320-K byte diskette drives. **Expansion Slots:** 3 available slots. **Memory:** 128-K bytes RAM expandable to 640-K bytes. **Display:** 9-inch green diagonal monochrome dual-mode monitor, high-resolution text characters, high-resolution graphics. **Interfaces:** RGB color monitor, RF modulator, composite video, and parallel printer. **Keyboard:** Standard IBM PC layout (83-key). **Physical Specifications:** 20"W x 8½"H x 16"D.

The COMPAQ PLUS

Specifications the same with the exception of: One 360-K byte diskette drive, one 10-Megabyte fixed disk drive, 2 available expansion slots, and full compatibility with all major software applications written for the IBM PC and PC/*XT*.

Lasting value led to instant success for the COMPAQ DESKPRO.

If you don't need all the extra performance of the COMPAQ DESKPRO 286, you can buy the popularly priced COMPAQ DESKPRO and still get many advanced features.

A command performance at every level

The COMPAQ DESKPRO Series allows you to buy as *much* computer as you need—not *more* computer than you need.

It's a polished performer, from entry level to advanced computing, in one totally expandable unit. Its plug-in, modular design accepts up to four separate storage devices. You select almost any combination of diskette or fixed disk drives you desire. And there's the practical, internal fixed disk drive back-up system to protect and store your data. So as your needs grow, the DESKPRO grows.

In fact it will grow from an IBM PC to far beyond the IBM PC/*XT* level of functionality. The COMPAQ DESKPRO will run all the popular programs written for both the IBM PC and PC/*XT*, two to three times *faster*, without sacrificing compatibility.

Internal expandability saves desk space.

Power? It's got what it takes.

The COMPAQ DESKPRO can be easily configured for scientific, engineering, and advanced business applications.

A high-performance, 30-Megabyte fixed disk drive provides added storage capacity.

The ability to add a high-speed 8087-2 coprocessor lets you deal with complex scientific calculations and economic models.

SPECIFICATIONS

The COMPAQ DESKPRO

Processor: 16-bit 8086; 4.77 or 7.14 MHz clock speed. **Software:** Fully compatible with all major software applications written for the IBM PC and PC/*XT*. **Expansion Slots:** 6 slots available in base configuration. **Memory:** 128-K bytes RAM, expandable to 640-K bytes. **Storage Devices:** One or two 360-K byte diskette drives, 10-(half-height) or 30-Megabyte fixed disk drives, fixed disk drive back-up (10 Megabytes per tape). **Interfaces:** RGB color monitor, RF modulator, composite video, parallel printer, and asynchronous communications interfaces. **Keyboard:** Standard IBM PC layout (83-key). **Display:** 12-inch diagonal green or amber dual-mode monitor, high-resolution text characters, high-resolution graphics. **Physical Specifications:** System unit—19.8″W x 5.8″H x 16.5″D, Keyboard unit—18.0″W x 1.5″H x 7.0″D.

Features common to COMPAQ in most other

It's been easy for COMPAQ to recognize the compromises other personal computer makers have been making.

It's been just as easy to avoid them.

That's why performance, expandability, compatibility, durability, and versatility are features you'll find in the entire COMPAQ family of computers.

How advanced technology affects the choice you make

There's an ever-growing library of fast, powerful programs designed for the IBM PC-AT and compatible with the COMPAQ PORTABLE 286 and COMPAQ DESKPRO 286. These programs will utilize the full potential of the computer "nerve center"—the Intel 80286 microprocessor.

If you own a COMPAQ Portable, COMPAQ PLUS, or COMPAQ DESKPRO, you may discover that these newer programs are simply too big to run on your computer.

Therefore you have a choice: the extra power and speed of the 80286 or the popular COMPAQ Personal Computers that use the 8088 and 8086 microprocessors. Remember that the COMPAQ PORTABLE 286 and COMPAQ DESKPRO 286 offer more power, speed and performance than any other personal computer. If your needs don't require the advanced technology, or you need a second computer to complement the one you have now, consider the COMPAQ Portable, COMPAQ PLUS, or COMPAQ DESKPRO. All three are hardware and software compatible with the IBM PC and PC/*XT*. Our intention is to give you a choice without forcing you to invest in more, or less, computing power than you think you need.

Of course, COMPAQ Personal Computers maintain compatibility with the add-on devices and expansion boards available for industry-standard personal computers, without any alteration or modification.

Increased power without increased size

All COMPAQ Personal Computers can take on more memory and storage without taking up more space. The COMPAQ Portable becomes a COMPAQ PLUS when you add a 10-Megabyte fixed disk drive. The COMPAQ PORTABLE 286 can accept a 20-Megabyte fixed disk drive. The fixed disk drive fits neatly beside the diskette drive inside the unit.

Internal add-on devices add greatly to the capabilities of a COMPAQ Computer.

With the COMPAQ DESKPRO and COMPAQ DESKPRO 286, you can install almost any available combination of diskette or fixed disk drives you desire to achieve the level of performance you need. The COMPAQ DESKPRO and COMPAQ DESKPRO 286, along with the COMPAQ PORTABLE 286, can accept the fixed disk drive back-up system as one of the internal storage devices.

There are slots inside each COMPAQ Computer for optional expansion boards. These boards greatly enhance the functionality and versatility of your computer. Literally hundreds are available to plug right in. Each lets you do something different. Like expanding the amount of memory in your computer. Or communicating with other personal computers. Or

Computers are features uncommon personal computers.

even communicating with mainframe computers.

Built tough to take it

COMPAQ Portable Computers are expected to take some hard knocks. A specially designed shock isolation system protects the diskette drives from jolts and vibration.

Their inner components are surrounded by a cross-braced aluminum frame. Those equipped with fixed disk drives are protected by a triple shock mount system. Plus, the outer case is molded from high-impact plastic, the same kind used to make bulletproof windows and space helmet faceplates. COMPAQ Portable Computers are tough, protecting your data from every angle.

COMPAQ DESKPRO Computers are no pushovers, either. They're surrounded by a protective steel shell.

They're the only desktop computers made with protective shock mounts, isolating the disk drive compartments from those unexpected but inevitable bumps and knocks that can cause downtime.

Even our monitors do more

COMPAQ Computers display data on high-quality monitors. All models can display high-resolution text and graphics on the same screen. The dual-mode display saves you the cost and clutter of a second monitor. COMPAQ DESKPRO Computers give you a

High-resolution text and graphics on one screen eliminates the need for a second monitor.

choice of an amber or green display.

From pinstripe suits to flight jumpsuits

The structure and design of COMPAQ Computers best characterize their widespread usefulness and respected capabilities. COMPAQ attentiveness to construction details and concern for functionality under stressful conditions are why these computers have received worldwide acceptance.

That's why you'll find a COMPAQ Computer on the bench of a major league baseball team tracking player performance.

At the South Pole monitoring weather conditions for the research team of a major university.

On tour with famous rock stars to help plan concerts, keep up with the finances, and receive electronic mail.

On motion picture sound stages scheduling production and maintaining equipment inventory.

On military surveillance planes logging information five miles aboveground.

In the halls of the Supreme Court answering complex questions on environmental issues.

Computers people believe in

It didn't take long for the public to recognize COMPAQ Computer quality. No one builds them the way we do. Which is why no other computer company has grown the way we have.

As personal computers become more and more commonplace, more and more people have come to appreciate that quality. Our commitment to providing a product that's beyond compromise assures a product beyond compare. We like to think of it in a simple phrase that bears repeating: It simply works better.

COMPAQ Portable Computers have the ruggedness and durability for almost any work environment.

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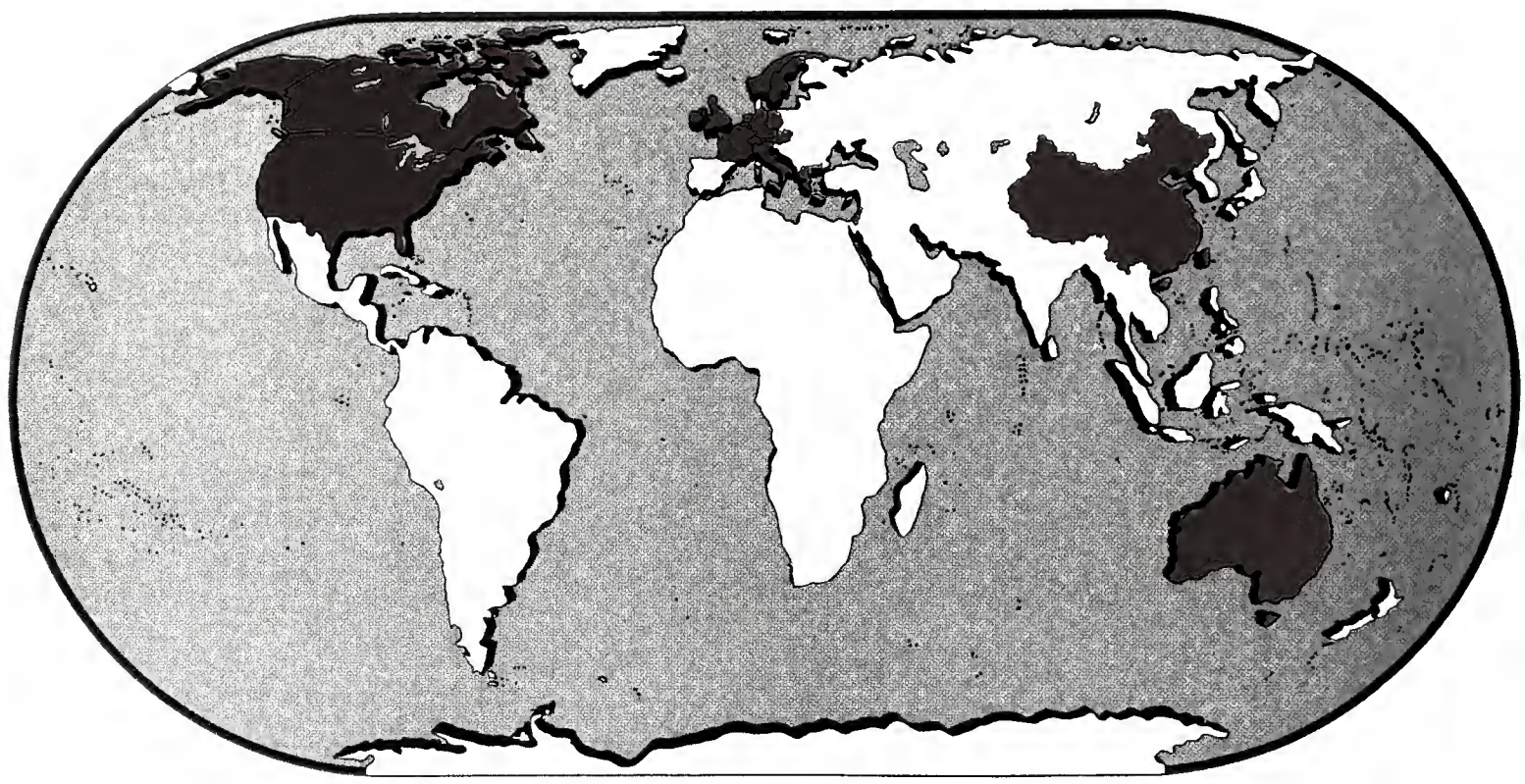

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Part No. 102941-001

NCC Preview

Local network market making steady progress in U.S.

By Kathleen Sullivan
CW West Coast Bureau

Although they have not yet taken U.S. businesses by storm, local-area networks are "going in at a steady rate," said Harvey Freeman, vice-president of engineering at Architecture Technology Corp., a Minneapolis, Minn.-based consulting firm that specializes in networks.

Growth in the local-area network market is continuing, Freeman said, and eventually, networks will be as commonplace as personal computers. But a number of important issues remain to be addressed before they gain widespread acceptance.

Some of those issues will be discussed in seminar sessions in the local-area network track, which Freeman organized. "In choosing topics, I tried to stress practical issues in networks and distributed communications," he said.

"Since this is the 10th anniversary of IBM's announcement on Systems Network Architecture [SNA], I solicited speakers from IBM and from its main competitors, the companies that support the International Standards Organization/Open Systems Interconnect model," he said.

A number of software topics will be covered in the seminars, including the impact of communications software on networks, the arrival of network operating systems and the development of applications software tailored for networks, Freeman said. Networking in the factory will also be discussed.

In addition, a variety of panelists will explore the effect of industry standards on innovation in the market, as well as the practical impact of standards. "Standards are really becoming more important," Freeman noted.

In one session, a group of speakers from IBM will discuss SNA, its history and future direction. In another seminar, panelists will explore the impact of IBM's PC Net on the market.

"We've gotten past the point of talking about baseband, broadband, token-ring and [carrier-sense multiple access with collision detection], to talking about the real issues," Freeman said. Now users are raising questions, he said.

What impact will IBM have on standards in the network market? What applications programs are available for networks? What are companies trying to do in factory environments? What about individual site locations? What cables will be used?

The impact of fiber optics on local-area networks will be the focus of another session. Freeman said he expects this nascent market to take off in the future. "With IBM and AT&T announcing fiber-optic cables, there will probably be a lot more happening in this market," Freeman said.

In another session, a group of panelists will explore some of the alternative communications systems for IBM personal computers. Presenting different perspectives on the issue will be representatives from a personal computer firm, a local-area network vendor, a vendor of microcomputer-to-mainframe software links and a user.

In the concluding session, panelists will talk about the future direction of networks. Topics to be addressed include the following: network costs vs. user budgets, functionality, network independence, "supernetworks," and gateways and bridges to other networks.

Goode, Afips prizes slated for keynote day

By Charles Babcock
CW New York Bureau

CHICAGO — The Harry Goode Memorial Award and American Federation of Information Processing Societies, Inc. (Afips) Distinguished Service Award will be presented to recipients Monday morning during the National Computer Conference's keynote address.

The awards recognize professional contributions by individuals to the development of the computer industry.

Harry H. Goode was the former chairman of the National Joint Computer Committee and has been described as a moving force behind the early cooperation of professional computer societies. Goode was killed in an automobile accident before the formal chartering of Afips, which created the award in his memory in 1964.

This award is given to an individual each year. Previous recipients have been Kenneth E. Iverson, Herman H. Goldstine, J. Presper Eckert and Grace Murray Hopper. Last year the prize was given to Ralph E. Gomory, director of research at IBM since 1970.

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NCC Preview

Micro track agenda tackles wide spectrum of issues

By Kathleen Sullivan
CW West Coast Bureau

Under the rubric of personal computing, a variety of issues — from the continuing shakeout in the personal computer industry to the use of artificial intelligence on microcomputers — will be addressed at National Computer Conference (NCC) '85 sessions.

In a recent interview, James R. Gerdes, a senior information systems analyst with the Argonne National Laboratory in Argonne, Ill., who is the chairman of the personal computing track, said the sessions will cover general industry trends as well as the practical application of new technologies.

The track will feature a number of panel discussions. In one session, a trio of financial analysts will present a look at the current state of the industry, Gerdes said. The first half of 1985 has been a difficult one for most players in the personal computer industry; many companies have predicted reduced earnings and announced cutbacks, layoffs and plant closings. The panelists will discuss the shakeout and its implications for the future.

Another session will promote a panel discussion on the industry from a different point of view, that of the top executive, Gerdes said. A group of executives, representing a bank, a manufacturing concern, a hospital and a financial institution, will discuss their perspectives on data processing.

Panel of trade press reporters

Offering yet another outlook on the personal computer industry and its players will be a session featuring a panel of reporters from the trade press, Gerdes said.

In addition, Gerdes stated that the personal computing track will include sessions geared toward more technically oriented audiences.

In a session titled "Window Management Systems: Fact or Fiction," a speaker from the University of Arizona will take a hard look at windowing systems. The question that will be explored, according to Gerdes, is whether window management systems are gimmicks, or whether they serve a useful function in personal computer programs.

The application of artificial intelligence techniques to personal computer programs will be the focus of another session in the personal computing track. In this seminar, speakers will present an overview of the AI field. A survey of currently available programs will be presented, Gerdes said.

The session, titled "Microcomputer Software Testing," will address several questions, according to the track chairman. Questions to be addressed include the following: Will the personal computer industry adopt the equivalent of a "Good Housekeeping Seal of Approval" for software programs? What techniques are currently used to test software programs before they are shipped?

Another panel, which will include an industry analyst and representatives from two computer companies, will review the current crop of briefcase-size computers and discuss market trends affecting these "truly portable" systems, Gerdes said. The session is titled "Popular Portable Computers."

A trio of speakers will discuss keyless data entry techniques, such as bar code entry and optical character reading, Gerdes said. A representative of the U.S. Department of Defense will relate the agency's experiences with bar code readers, and a manufacturer will talk about what products are available.

Visitors lounge offers services to foreign guests

CHICAGO — The International Visitors Lounge at the National Computer Conference (NCC) will be located in Lobby 8, Level 20, at McCormick Place.

Conference attendees from foreign lands are invited to take advantage of the various services available in the lounge. The room can be used as a place to relax or to exchange information with fellow international attendees.

Special services available to foreign visitors include translation, registration assistance, traveler's aid, local information and refreshments.

Available languages

Translation services will be made available in French, Spanish, Japanese, Chinese and German. Translation services for other languages can be arranged, if needed.

The International Visitors Lounge will be open during regular conference hours: Monday through Wednesday from 8 a.m. until 6 p.m. and on Thursday from 8 a.m. until 4 p.m.

Foreign visitors may register for NCC by sending registration forms and checks to NCC '85 Registration, 1970 Chain Bridge Road, McLean, Va. 22109.

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Contents of Volume I

Volume One is a comprehensive, 424-page reference manual on the features and functions of UNIX. Designed for clarity and day-to-day usefulness, it is organized by UNIX terminology and based on a common format. Each entry provides: the name of the command or subroutine... a synopsis and detailed description of the command and its use... a list of files built into the program... and the various condition codes you may encounter. There's even a helpful section that alerts you to known bugs in the command and sometimes suggests an appropriate fix.

Here is a sample of the topics covered:

Commands: These are general purpose programs which can be invoked directly by the user. You'll see how to use commands like *adb* to debug programs in a controlled environment... and *bas*, the UNIX BASIC dialect.

System Calls: You get a thorough list of entries into the UNIX supervisor, both error return codes and user instructions.

Subroutines: Here is a detailed introduction to the variety of subroutines available in the UNIX libraries. The functions are described in terms of C, but most will work with Fortran as well.

Special Files: The manual gives you a complete description of the UNIX "files" that actually reference system I/O devices.

File Formats: Here is full documentation on file structure for link editor output, special accounting information, archive data, core image files, and more.

Games: You also get a listing of computer games available in UNIX, including backgammon, blackjack, checkers and chess.

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Contents of Volume II

The UNIX Programmer's Manual: Volume II, Seventh Edition, is the ideal companion volume for UNIX programmers who want comprehensive, detailed information on all the many capabilities of the UNIX Time-Sharing System. Here is a vast collection of articles and tutorials on a wide range of specialized topics:

- how to log onto UNIX from a variety of system terminals
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There's also detailed information on system implementation and maintenance... how to regenerate system software... the inner workings of the UNIX I/O system... UNIX networks... and UNIX password security.

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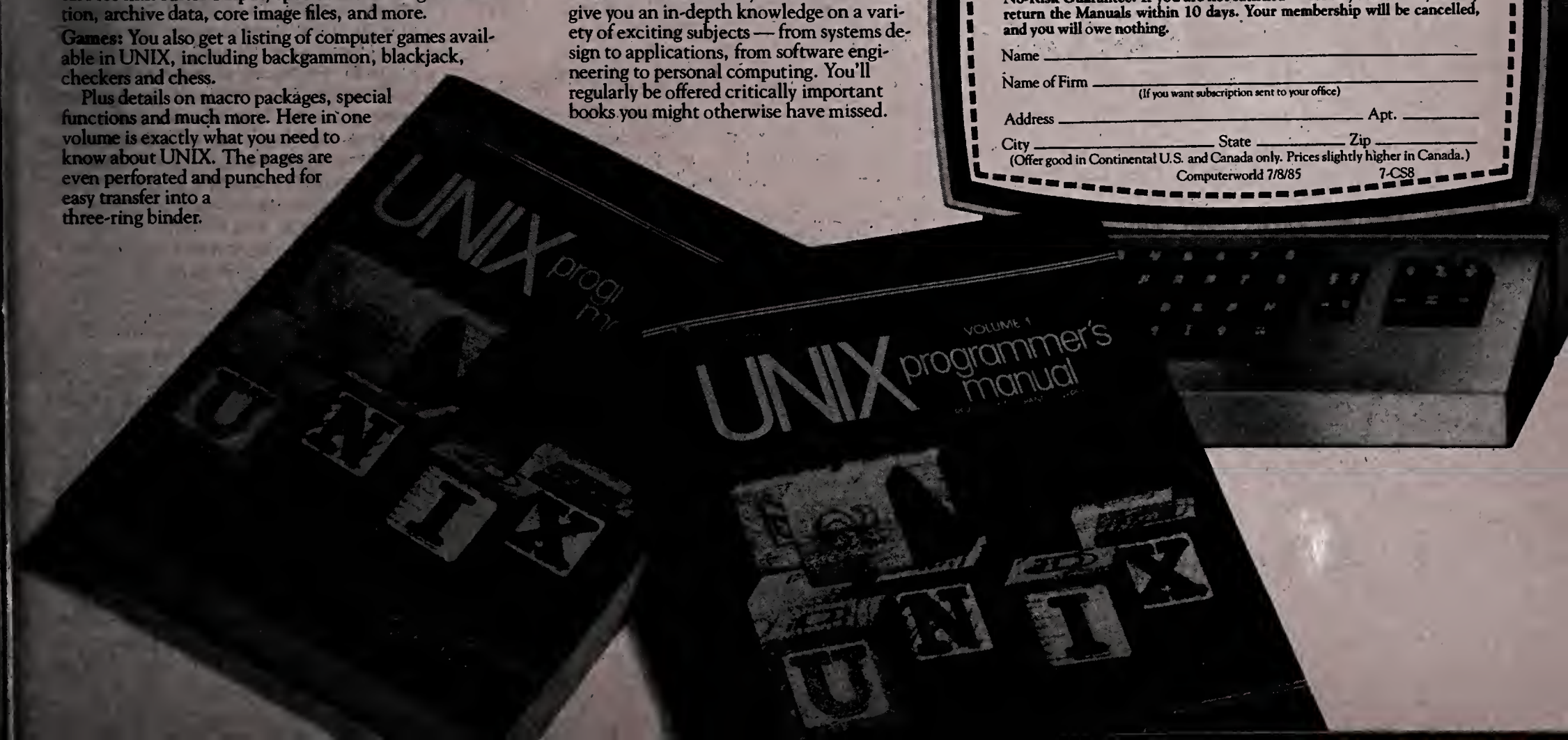

NCC Preview

Management system propels O'Hare airport operations

Assorted modules handle varied tasks

By Donna Raimondi
CW Staff

CHICAGO — O'Hare International Airport — said to be the world's busiest — serves 120,000 travelers a day and an equal number of visitors.

The airport, which is handling 15 million more passengers a year than it was designed to accommodate, is using a computer-based management system to track a $1.5 billion eight-year development program that will add to and upgrade facilities.

The computer-based management system allows managers of the Chicago O'Hare International Airport Development Program to highlight future problems and to provide information to run the program on a daily basis.

The airport's development program comprises 100 projects, including airfield improvements such as runways and grading for cargo and service complexes, new terminals, additional roads and access areas, a $100 million people-mover system and a taxiway for airplanes in the central core of the airport, said James Stevenson, general manager of O'Hare Associates, a consulting group that supervises and does consulting for the development program.

The system that tracks the airport's development program is Metier Management Systems, Inc.'s Artemis, which runs on a Hewlett-Packard Co. HP 1000 minicomputer, said Paul Dembovich, cost and schedule engineer for Envirodyne Engineers, Inc., one of the joint venture partners in O'Hare Associates. Dembovich and his staff perform critical path analysis for each of the 100 projects using one module of Artemis, he said.

The critical path module calculates and predicts end dates for projects based on monthly information updates, Dembovich said. It associates the information fed into it with labor data, such as workers' days off because of holidays and extra work-shift information, he said.

A relational data base module allows the creation of data bases that link schedules with cost information and allow the staff to calculate cash flows, to project commitment curves and to perform trend analysis, he said.

Three graphics modules

Three different graphics modules allow Dembovich to present end-of-month reports in three large charts, instead of in the report — the size of the city phone book — that the system generates, he said. The management graphics module allows bar, pie and line charts, histograms, curves and profiles, he said.

It is used to compare budgets to current estimates, and it allows a breakout of major categories of accounting for jobs in question, Dembovich said. Curves compare where money was actually spent with where it was projected to be spent.

Accumulated year-to-date information and yearly budget information is shown in a vertical box. There is a cash flow graph to the end of a project, and a graph for cash commitments and their amounts to the end of the project, he said.

A bar-chart drawing package links to the critical path program schedules so it can automatically draw charts for use in presentations, Dembovich said. "We can summarize 100 projects on one page, with a calendar across the top," he said. This helps management to see where each project is in terms of construction, design or completion, he said. Dembovich produces critical path schedules for each project separately as well.

Graphics reports for a variety of people, including Chicago Mayor Harold Washington, the directors of O'Hare's development program, bond holders, project managers and field staff, are customized to give each person what he needs, he said.

A linked bar chart package draws bars and shows the relationship between projects, Dembovich said. It can show the status of separate jobs within a project, he added.

A report-generating module of Artemis uses data from the critical path and the data base modules to create tabular reports, Dembovich said. It has a free format, so he can change headings and columns for particular needs, he said. The module has five or six sorts, but Dembovich claims he rarely uses more than three of them. He uses this tabular report to show schedule dates and the dollars associated with dates and activities.

When the company bought the system, "we loaded data for three months to be productive and for six months to be proficient," Dembovich said.

Dembovich stated that the collection and loading of data is a full-time job for four people. There are hundreds of people to collect data from or give reports to, he said. There are often time lags in getting needed information from city personnel, he said, and sometimes information gets lost.

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NCC Preview

Systems tracking NCC events get the show on the road

By Kathleen Burton
CW West Coast Bureau

CHICAGO — A variety of computers, terminals and videotex systems will keep National Computer Conference (NCC) activities on track at Chicago's McCormack Place this year.

Without this equipment, show operations would be paralyzed, said Gerald Roper, director of marketing and sales for the Chicago Convention Bureau, which rents space at McCormack Place.

On the show floor, for example, videotex systems will be used to help attendees locate more than 600 exhibitor booths spread out over 25,000 square feet of cavernous floor space.

Behind the scenes, show sponsors will use computer systems to bill exhibitors and keep track of thousands of hotel reservations, Roper added. The equipment will be supplied by McCormack Place, the Chicago Convention Bureau, contractors and manufacturers' donations.

The following computer systems will form the backbone of NCC's 1985 operations:

■ McCormack Place will use an IBM System/36 minicomputer, running a customized version of IBM's SSP operating system, to store a show status calendar and to bill exhibitors for electricity and plumbing services used during the show, Roper claimed.

Ten IBM Model 88 terminals will be used by McCormack Place staff to access the system, which runs customized data base, accounting and word processing software.

> *Without this equipment, show operations would be paralyzed.*
>
> — Gerald Roper
> Chicago Convention Bureau

■ The Chicago Convention Bureau will use an IBM Series/1 minicomputer, running under IBM's EDX operating system, and five IBM Model 5 terminals to make hotel reservations for many of NCC's 80,000 attendees. Up to 100,000 hotel reservations can be maintained on the system using the bureau's proprietary Bold Pack Housing Systems software package.

In addition to hotel information, Roper said, exhibitor booking records and data on exhibit space and NCC seminars will be stored on the Series/1 using customized data base management system (DBMS) software.

Other computer systems at NCC will be donated by manufacturers and contractors hired by the show's cosponsor, the American Federation of Information Processing Societies, Inc. in Reston, Va. These systems will include the following:

■ Seventeen Sperry Corp. Model 500 personal computers donated by the Blue Bell, Pa.-based vendor to the NCC pressroom. About 1,000 journalists are expected to attend NCC and use the computers, which will be equipped with high-resolution color monitors, 10M-byte disk drives and a 256K-byte memory, a Sperry spokesman said.

The computers will be networked to two Sperry User-Net local-area networks.

Sperry will also provide four Epson America, Inc. Model 5 dot matrix printers, four Hayes Microcomputer Products, Inc. Smartmodems and Wordstar 2000 from Micropro International Corp. in San Rafael, Calif., the spokesman said.

■ On the show floor, public-access videotex will be provided by Chicago-based Convention Communications, Inc. (CCI). Each of CCI's 18 videotex Touchscreen terminals will function as an electronic message center, an exhibitor locator and an entertainment guide for showgoers, said CCI President Tony Stenkis. Attendees can switch modes on the terminal by touching the screen and following the directions of icon-oriented menus.

At the heart of the system is a 32-user microcomputer from Molecular Computer Corp. in San Jose, Calif., running under Digital Research, Inc.'s CP/M operating system. The microcomputer, at CCI's Chicago headquarters, will receive data from the show floor via proprietary communications software inside the terminals, Stenkis said. CCI will also use 18 modems from CTS Corp. in Elkhart, Ind., to transmit data, Stenkis said.

■ The Ventura, Calif.-based Contractor Registration Control Systems Corp. (CRCS) will provide computerized, on-site registration for show attendees using a Data General Corp. Model 30 minicomputer linked to 48 Liberty terminals from Liberty Electronics Corp. in San Francisco. Sixty percent of NCC's attendees will register at the show, and CRCS' staff will enter the registration data and make badges on an automatic embosser interfaced with the computer, said Gary Palmer, CRCS director of research.

CRCS' proprietary operating system, data entry, DBMS and communications software will reside on the Model 30, according to Palmer. A customized version of DG's Star-Lan local-area network will also be used, he said.

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NCC Preview

Fresh views expected on end-user computing topics

By Kathleen Sullivan
CW West Coast Bureau

When organizing the sessions that fell under the umbrella of end-user computing, track organizer Marvin Ehlers, an assistant vice-president at Lombard, Ill.-based Natural Gas Pipeline Co., said he recruited speakers who would be able to provide "a new and different view of existing topics."

A number of the topics to be discussed have more to do with economics — how to provide end users with the necessary tools to do their work efficiently — than with the technology itself, Ehlers said.

A wide range of issues will be covered, from designing ergonomic workplaces, to selecting the software that will facilitate end-user computing, to planning the intelligent buildings that will house the workers and technologies of the '80s.

> *Many MIS departments are struggling to find the best way to manage new end-user computing tools.*

With the growing number of workers sitting in front of computer screens, ergonomics — the science of designing equipment and workplaces to suit the worker — has become an increasingly important topic. Panelists will discuss the ergonomic requirements of the modern office. The speakers will also talk about legal issues related to the use of VDTs, including pending state legislation regarding worker safety.

Many MIS departments are struggling to find the best way to manage new end-user computing tools. With the advent of data bases, fourth-generation languages and other user-friendly tools, many MIS professionals are asking the question: What is the best way to get these tools into the hands of end users, Ehlers said. A group of speakers will explore this topic, presenting their ideas for managing these technologies.

Micro-to-mainframe links

An assessment of the state of the art in the micro-to-mainframe link market will be the focus of another panel discussion. The speakers will explore the problems and privileges associated with gaining access to the mainframe, Ehlers said. The presentation will include a user's perspective on the planning required to implement a micro-to-mainframe link strategy.

Another group of speakers will provide a look at electronic mail systems, bringing the audience up to date on recent developments in the market, Ehlers said. What is available today? What have we learned since last year? What can be expected in the future? These and other questions will be discussed, Ehlers said.

Managing the information center will be the focus of another session in the end-user computing track, Ehlers said. "Information centers are fairly widespread," he noted. As a result, managers can now look to each other for advice on how to run them. "There are many general management principles that can be applied to information centers," Ehlers said. A group of speakers will share their experiences in running information centers.

Within the MIS department, staff members are looking for the easiest, fastest and most economical way to develop programs, Ehlers said. Prototyping methods, for example, are generating interest. One panel will discuss the challenge of managing the development center.

The selection of the appropriate applications software package, which Ehlers described as an ongoing problem for many users, will be the subject of another presentation in the end-user computing track.

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UNIX Fundamentals for Non-Programmers*	Apr 10-12 June 12-14 Aug 7-9 Oct 9-11 Dec 4-6	Jan 16-18 May 29-31 Oct 2-4	Mar 20-22 July 31-Aug 2 Dec 18-20	Jan 16-18 Mar 20-22 May 29-31 July 31-Aug 2 Oct 2-4 Dec 18-20	Feb 20-22 June 19-21 Oct 16-18	Mar 13-15 Aug 21-23	Feb 20-22 June 19-21 Oct 16-18	Mar 13-15 Aug 21-23	$735	
UNIX Fundamentals for Programmers*	Apr 15-17 June 17-19 Aug 12-14 Oct 14-16 Dec 9-11	Jan 21-23 June 3-5 Oct 7-9	Mar 25-27 Aug 5-7	Jan 21-23 Mar 25-27 June 3-5 Aug 5-7 Oct 7-9	Feb 25-27 June 24-26 Oct 28-30	Mar 18-20 Aug 26-28	Jan 14-16 Feb 25-27 June 24-26 Oct 28-30	Mar 18-20 Aug 26-28	$735	$1125
Shell as a Command Language*	Apr 18-19 June 20-21 Aug 15-16 Oct 17-18 Dec 12-13	Jan 24-25 June 6-7 Oct 10-11	Mar 28-29 Aug 8-9	Jan 24-25 Mar 28-29 June 6-7 Aug 8-9 Oct 10-11	Feb 28-Mar 1 June 27-28 Oct 31-Nov 1	Mar 21-22 Aug 29-30	Jan 17-18 Feb 28-Mar 1 June 27-28 Oct 31-Nov 1	Mar 21-22 Aug 29-30	$490	
'C' Language Programming*	Apr 22-26 June 24-28 Aug 19-23 Oct 21-25 Dec 16-20	Jan 28-Feb 1 June 10-14 Oct 21-25	Apr 15-19 Aug 12-16	Jan 28-Feb 1 Apr 15-19 June 10-14 Aug 12-16 Oct 21-25	Mar 4-8 July 8-12 Nov 11-15	Apr 29-May 3 Sep 9-13	Jan 21-25 Mar 4-8 July 8-12 Nov 11-15	Apr 29-May 3 Sep 9-13	$1225	
Shell Programming*	Apr 29-30 July 1-2 Sept 2-3 Oct 28-29	Feb 4-5 June 17-18 Oct 28-29	Apr 22-23 Aug 19-20	Feb 4-5 Apr 22-23 June 17-18 Aug 19-20 Oct 28-29	Mar 11-12 July 15-16 Nov 18-19	May 6-7 Sep 16-17	Jan 28-29 Mar 11-12 July 15-16 Nov 18-19	May 6-7 Sep 16-17	$490	$1125
Using Advanced UNIX Commands*	May 1-3 July 3-5 Sept 4-6 Oct 30-Nov 1	Feb 6-8 June 19-21 Oct 30-Nov 1	Apr 24-26 Aug 21-23	Feb 6-8 Apr 24-26 June 19-21 Aug 21-23 Oct 30-Nov 1	Mar 13-15 July 17-19 Nov 20-22	May 8-10 Sep 18-20	Jan 30-Feb 1 Mar 13-15 July 17-19 Nov 20-22	May 8-10 Sep 18-20	$735	
UNIX Internals	May 7-10 July 8-12 Sept 4-6 Oct 30-Nov 1	Feb 11-15 June 24-28 Nov 11-15	Apr 29-May 3 Aug 26-30	Feb 11-15 Apr 29-May 3 June 24-28 Aug 26-30 Nov 11-15	Mar 18-22 July 22-26 Dec 2-6	May 13-17 Sep 23-27	Feb 4-8 Mar 18-22 July 22-26 Dec 2-6	May 13-17 Sep 23-27	$1375	
UNIX Administration*	May 15-17 July 15-17 Sept 18-20 Nov 11-13	Feb 19-21 July 9-11 Nov 19-21	May 7-9 Sep 10-12	Feb 19-21 May 7-9 July 9-11 Sep 10-12 Nov 19-21	Mar 26-28 July 30-Aug 1 Dec 10-12	May 21-23 Oct 1-3	Feb 12-14 Mar 26-28 July 30-Aug 1 Dec 10-12	May 21-23 Oct 1-3	$735	
Advanced 'C' Programming Workshop*	May 20-21 July 22-23 Sept 23-24 Nov 18-19	Feb 25-26 July 15-16 Dec 2-3	May 13-14 Sep 16-17	Feb 25-26 May 13-14 July 15-16 Sep 16-17 Dec 2-3	Apr 15-16 Aug 5-6 Dec 16-17	Jan 14-15 June 3-4 Oct 7-8	Apr 15-16 Aug 5-6 Dec 16-17	Jan 14-15 June 3-4 Oct 7-8	$490	$1125
Advanced 'C' Programming Under UNIX*	May 22-24 July 24-26 Sept 25-27 Nov 20-22	Feb 27-Mar 1 July 17-19 Dec 4-6	May 15-17 Sep 18-20	Feb 27-Mar 1 May 15-17 July 17-19 Sep 18-20 Dec 4-6	Apr 17-19 Aug 7-9 Dec 18-20	Jan 16-18 June 5-7 Oct 9-11	Apr 17-19 Aug 7-9 Dec 18-20	Jan 16-18 June 5-7 Oct 9-11	$735	
Berkeley Fundamentals and 'csh' Shell*	June 3-7 July 29-Aug 2 Sept 30-Oct 4 Nov 25-29	Mar 4-8 July 22-26 Dec 9-13	May 20-24 Sep 23-27	Mar 4-8 May 20-24 July 22-26 Sep 23-27 Dec 9-13	Apr 22-26 Aug 12-16	Jan 28-Feb 1 June 10-14 Oct 21-25	Apr 22-26 Aug 12-16	Jan 28-Feb 1 June 10-14 Oct 21-25	$1225	

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First aid facility available at NCC

CHICAGO — For National Computer Conference attendees needing medical assistance, a four-room first aid facility is located just south of the main lobby on the concourse of McCormick Place. A registered nurse will staff the station during show hours.

Lorin Tomaszewski, McCormick Place fire warden, said five security officers and two fire inspection officers trained in first aid assistance will be on duty on the showroom floor throughout the conference.

In case of emergency, Chicago Fire Department ambulances will be available for transportation to one of two local hospitals: Michael Reese Hospital, 292 S. Ellis Ave., or Mercy Hospital, Stevenson Expwy. at King Drive. Both are less than 1 mile south of McCormick Place.

NCC Preview

Ancient idea reborn in computer-based learning aids

AI at forefront of systems R&D

By Kathleen Sullivan
CW West Coast Bureau

The concept of an expert system is a relatively new one in the computer industry, but according to Prof. David Rine, interest in "expert tutors" dates back to the ancient Greeks, when Socrates used dialogue as a teaching tool.

"Interactive questioning and dialogue has always been a very popular way of teaching," said Rine, a professor of computer and information sciences at George Mason University in Fairfax, Va. Those interested in modern-day expert tutoring systems can find out more at a panel discussion Rine organized for this year's education and social issues track.

The speakers will focus on recent developments in artificial intelligence and the impact of that work on the development of educational systems. "There is a great deal of development and interest in designing high-quality, computer-based learning systems for business and training programs," Rine said.

> *"Interactive questioning and dialogue has always been a very popular way of teaching."*
> — Prof. David Rine
> George Mason University

In another panel discussion, "Computers and the Handicapped," a group of speakers will explore two major questions, Rine said: How can systems be designed for use by severely handicapped students? What tools are available for developing systems to aid the handicapped person?

A speaker from Johns Hopkins University in Baltimore will discuss its multisensory authoring package, a tool that allows developers to create lessons geared for students with specific disabilities. In addition, a speaker will present a look at how one system is being used by physically and mentally handicapped children in an experimental classroom.

Another set of seminars will focus on legislative and legal issues regarding computers and society, Rine said. A variety of topics will be addressed, including the legality of employment agreements, privacy and the protection of individual rights, copyright agreements and software piracy.

The tax benefits of philanthropic giving will also be addressed, Rine said. "The speakers will discuss how companies can get the best tax write-off when they give hardware to educational institutions," Rine said.

Selling computers to developing nations will be explored in another seminar. "A lot of companies want to get involved with Third World countries," Rine explained. "The speakers will discuss what firms need to know, in terms of social and cultural concepts, to most effectively introduce new technology into developing countries."

For others, recent developments in instructional delivery systems are an important topic, Rine said. A panel will discuss the advantages of satellite-based computer networks that can send instructional materials from a central location to training centers around the world.

A tutorial seminar on structured editing will also be offered. The audience will get a demonstration on how to use structured editors to develop programs, Rine said. The advantages of structured editing will be discussed. "One of the nice things about structured editing is that it speeds up the development and understanding of programs," Rine said. "Another side effect is more reliable data entry."

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NCC Preview

Software at NCC

THE SOFTWARE GROUP
Booth 1129

The Software Group will exhibit Enable, an integrated software system that provides a spreadsheet, word processing capability, graphics, a data base manager and telecommunications for the 256K-byte dual-floppy IBM Personal Computer and compatible computers.

In that configuration, the spreadsheet provides up to 136K bytes of work space and the data base manager holds 1.3G bytes of data, according to the vendor.

Enable reportedly provides windows to view spreadsheet, graphics and documents at the same time. Data can be transferred from window to window.

The menu-driven integrated package also offers concurrency, allowing users to continue their work session while documents print out or data comes in from a remote computer, the vendor said.

Enable sells for $695. Site licenses are also available.

The Software Group, Northway 10 Executive Park, Ballston Lake, N.Y. 12019.

SAMNA CORP.
Booth 3354

Samna Corp. will showcase word processing and office automation software for local-area networks and updates to its stand-alone personal computer software at its booth.

Initial releases of Samna software for local nets will support Novell, Inc. and 3COM Corp. local-area networks; releases later this year will support the IBM PC Network, the vendor said.

Local net versions are available for Samna Word III and Samna+.

Release 3.0 of Samna Word III and Samna+ support IBM's Document Content Architecture revisable form text format.

Samna Word III costs $550; Samna+ sells for $695.

Samna, Suite C-700, 2700 N. E. Expwy., Atlanta, Ga. 30345.

MICRO FOCUS, INC.
Booth 5521

Micro Focus, Inc. will demonstrate software that reportedly generates IMS/MFS and CICS/BMS macros and associated Cobol source statements for the IBM Personal Computer, Personal Computer XT, AT, 3270 Personal Computer and compatible microcomputers.

Called Co-Maps, the software lets users load and modify BMS macro definitions to produce maps and map sets. This capability allows users to convert CICS application screens to IMS, and images produced by Micro Focus Forms to MFS and BMS maps.

Other features include single keystroke map set, map and field definition and Help , directory and copy facilities.

Co-Maps costs $500.

Micro Focus, 2465 E. Bayshore Road, Palo Alto, Calif. 94303.

LEXEME CORP.
Booths 2957, 2958

Lexeme Corp. will present its computer language translation service.

The firm develops software to translate one high-level language to another from among C, Fortran, Cobol, Bliss, Pascal, PL/I, Ada and other languages, a spokesman said.

Lexeme software is also said to translate between dialects of the same language.

Prices vary according to the number of lines of code.

Lexeme, Suite 250, Commerce Court, Four Station Square, Pittsburgh, Pa. 15219.

BBJ COMPUTER SERVICES, INC.
Booth 2144

An AT&T Unix application development system will be the highlight of BBJ Computer Services, Inc.'s exhibit.

Called Today, the software is said to provide recursive logic and decision tables; synonyms, menus, prompts, Help and default facilities for streamlined definitions; screen painter; report generator; push-button self-documentation; audit trails; and source code security.

Today creates applications that are portable across Unix-based minicomputers and micros.

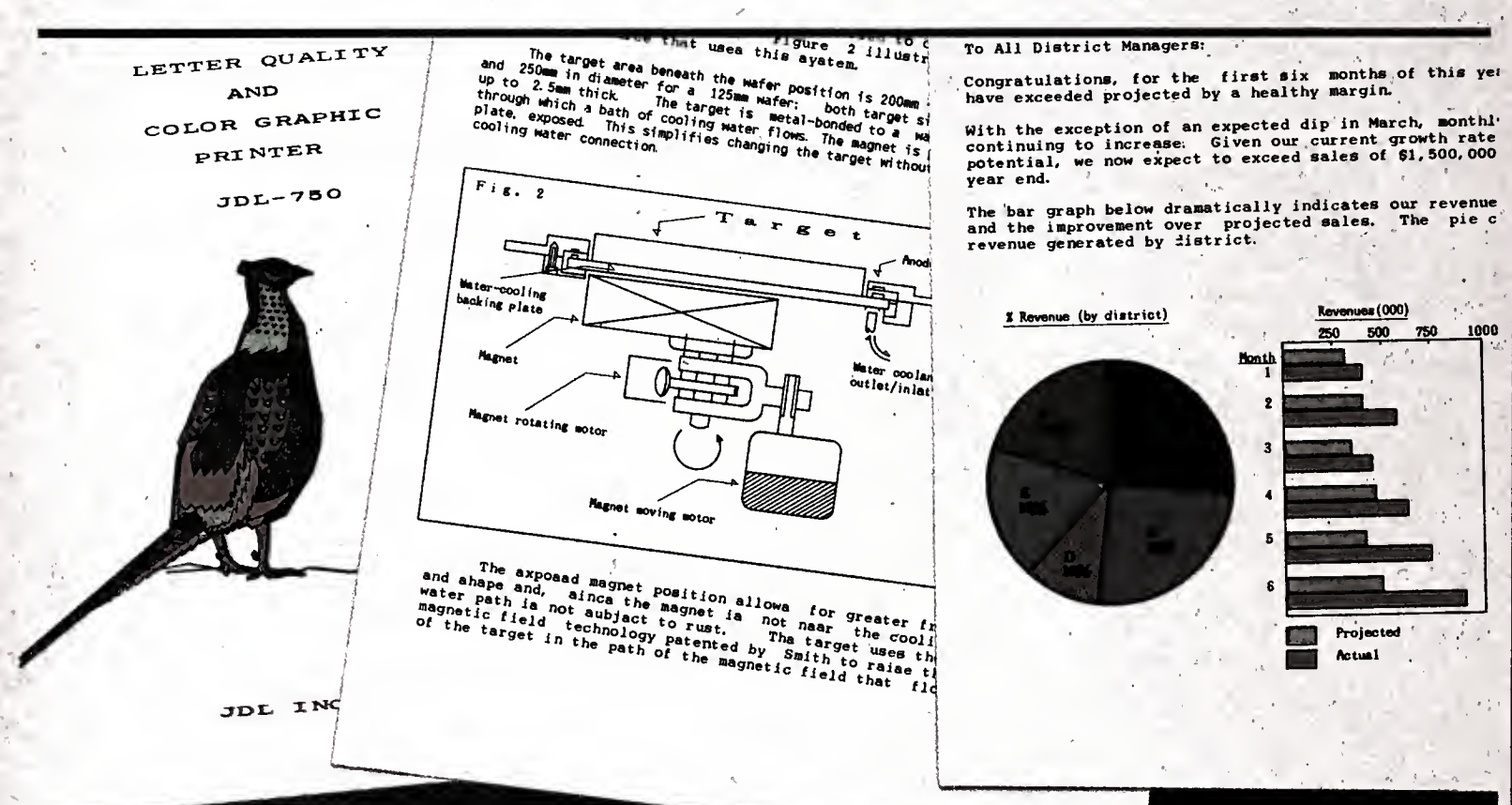
For an IBM Personal Computer AT, Today costs $1,500.

BBJ Computer Services, 2946 Scott Blvd., Santa Clara, Calif. 95054.

LAWSON ASSOCIATES, INC.
Booth 1254

Lawson Associates, Inc. will show an accounts payable package upgraded to include distribution default codes.

Continued on Preview/42



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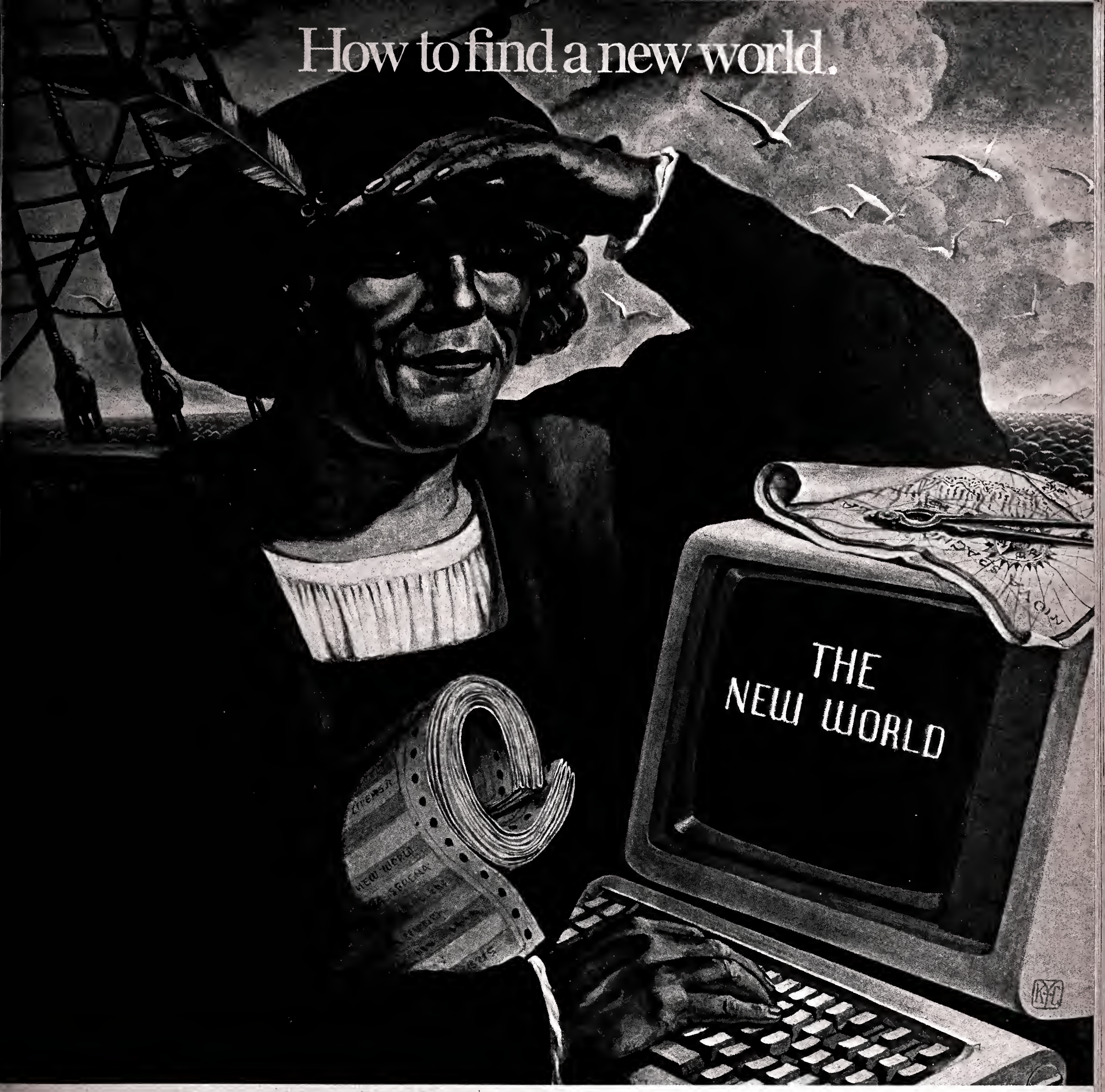

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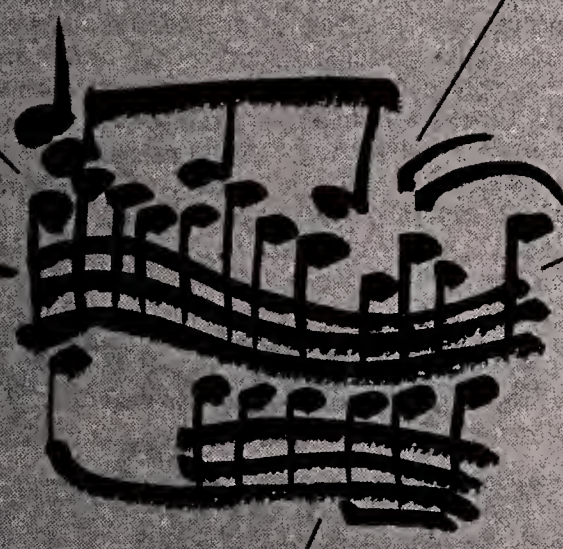

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NCC Preview

Software at NCC

Continued from Preview/38

These codes reportedly let users automatically allocate expenses across multiple general ledger accounts and multiple companies.

Other enhancements include the ability to track, reconcile and control employee advances and expenses and track due and payable taxes, the vendor said.

Prices, which include source code and training, are $14,000 for the IBM System/38, $19,000 for IBM mainframes and $24,000 for large-, medium- or small-scale Burroughs Corp. systems.

Lawson Associates, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

ZAX CORP.
Booth 1738

Zax Corp. will showcase two in-circuit emulators, one for the Motorola, Inc. 6809 and one for Intel Corp.'s 80186.

Called ICD-178, the 8-bit emulator for Motorola 6809 or 6809E is said to operate at 2 MHz and contain 64K bytes of static random-access memory (RAM) for downloading files, altering memory contents and loading future memory into a target system.

Memory can be mapped to selected addresses in 1K-byte blocks and designated as read-only, read/write, user and no memory, Zax said.

The ICD-278, a 16-bit emulator for the Intel 80186 or 80188 runs between 8 MHz and 12 MHz and contains 128K bytes of static RAM. Adding an optional internal memory board will increase available storage to 256K bytes; interfacing to an external hard-disk facility will boost memory capacity to 1M byte.

Both models are said to provide four hardware breakpoints, eight software breakpoints, an external break probe, an external break output and a real-time trace buffer that can record and store portions of program memory contents.

The ICD-178 costs $4,995; the ICD-278 is priced at $7,995.

Zax, 2572 White Road, Irvine, Calif. 92714.

ORACLE CORP.
Booth 3524

Oracle Corp. will present the SQL-based Oracle relational data base management system and Oracle Link.

The data base manager is said to include an application generator, report writer and color graphics capability.

Through question-and-answer dialogues, the applications generator helps users build multiuser data entry, query and update applications.

A report writer creates production and ad hoc reports and automatically formats SQL query results into reports with column headings and data formats taken from the data dictionary. Oracle graphics reportedly lets users display data in color as pie charts, bar charts or multiline plots, according to the vendor.

The Oracle Link program provides connections among Oracle data bases to upload and download both data and applications between a personal computer and any other Oracle system in any host environment.

Oracle costs $30,000 for an initial systemwide license.

Oracle, 2710 Sand Hill Road, Menlo Park, Calif. 94025.

IMSL, INC.
Booths 4803, 4804

IMSL, Inc. will show the IMSL Library, now available for Hewlett-Packard Co. Series 9000 computers.

The IMSL Library contains over 500 Fortran subroutines for mathematical and statistical applications. It is compatible with the HP Series 9000 Models 520, 530 and 540 running the Fortran 77 compiler under the HP VX operating system. A first-year license is priced at $1,200.

IMSL, NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036.

SEASIDE SOFTWARE
Booth 2828

Seaside Software will exhibit a text-oriented data base management system for the IBM Personal Computer, PCjr, Personal Computer XT, AT and compatible processors under DOS 2.0 or higher.

Called Asksam, the software supports free-form, variable-length records. Keyword retrievals can include logical operators and wildcards and can be routed to screen, printer or disk and sorted on any field.

The software costs $149.95.

Seaside Software, 538 Parade Drive, Corpus Christi, Texas 78412.

WINTEK CORP.
Booth 1727

Wintek Corp. will show Smartwork software, a tool for creating printed circuit board artwork running on the IBM Personal Computer, Personal Computer XT and AT.

Smartwork produces single-sided or double-sided printed circuit boards up to 10 by 16 in. Prototype quality 2X plots can be made on a dot matrix printer and production-quality artwork can be produced with a pen-and-ink plotter.

The program sells for $895.

Wintek, 1801 South St., Lafayette, Ind. 47904.

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Rip Van Winkle Waking Up. Engraving by Darley. Courtesy: The Bettman Archive

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NCC Preview

Microcomputers at NCC

ITT INFORMATION SYSTEMS
Booth 4315

ITT Information Systems will exhibit ITT Xtra XP, its IBM Personal Computer XT-compatible personal computer.

The Xtra XP is based on an Intel Corp. 80286 processor and incorporates a zero wait state architecture.

The product uses 512K bytes of random-access memory that is expandable to 640K bytes. An additional 1M byte of memory is available through an expansion board, the vendor said. The Xtra XP also includes five Personal Computer XT expansion adapter slots and read-only-memory-based diagnostics said to be capable of analyzing faults to chip level.

The ITT Xtra XP is priced from $3,995 to $4,595.

ITT Information Systems, 2350 Qume Drive, San Jose, Calif. 95131.

VIASYN CORP.
Booth 2117

Viasyn Corp. will demonstrate an enhanced version of its Compupro 286 multiuser microcomputer that is said to include an Intel Corp. 8-MHz 80286 processor supported by an upgraded version of Concurrent DOS 8/16 with PC-DOS Version 2 compatibility.

Other features are a multitasking slave processor for simultaneous execution of 8-bit tasks and electronic mail software for data file transfers between workstations.

Viasyn, 3506 Breakwater Court, Hayward, Calif. 94545.

PYRAMID TECHNOLOGY CORP.
Booth 5163

Pyramid Technology Corp. will exhibit the AT&T Unix-based Model 90X 32-bit computer, Model 90MX dual-processor version and the OSX version of Unix.

The 90X is said to provide a 120-nsec cycle time on three boards plus up to 128 user connections.

A three-tiered memory hierarchy consisting of virtual address space, physical memory and cache offers 4G bytes of user address space, the vendor said.

The 90MX reportedly offers 1.70 to 1.85 times the throughput of the 90X plus a maximum of 256 user connections.

OSX Unix derives from the University of California at Berkeley Unix 4.2 and AT&T's Unix System V. Features include virtual paging supported by demand paging, shared code and data during process creation and local-area networking.

Pyramid Technology, P.O. Box 1295, 1295 Charleston Road, Mountain View, Calif. 94039.

QUADRAM CORP.
Booth 2521

Quadram Corp. will showcase its line of microcomputer enhancement products, including the Quadscreen monochrome monitor, Quadlaser printer, Asher enhancement boards for integrating voice and data communications and Quadnet networks.

The Quadscreen monitor is designed for computer-assisted design and manufacturing applications and compatible with such programs as Autocad II and Cadmaster. A 17-in. screen reportedly provides a resolution of 968 horizontal dots by 512 vertical lines.

The monitor also includes dot addressability, spreadsheet and split-screen functions, according to the vendor.

The Quadlaser printer uses diode laser technology and electrophotographic imaging techniques. Print speeds run up to 8 page/min or about 330 char./sec., the vendor said.

A 300 by 300 dot/in. resolution is said to allow users to mix multiple font styles and graphics on one page.

Asher C1200 and C2400 voice/data communications cards can be installed inside a personal computer. The keyboard then controls all communications commands. Voice and data communications can occur simultaneously, according to the vendor.

Quadram will also display local network products including Quadnet II, a baseband network that reportedly links up to 32 IBM Personal Computer and compatible processors.

Quadscreen costs $1,995; Quadlaser sells for $3,795; the Asher C1200 is priced at $695; the C2400 costs $995.

A Quadnet II Master Kit, which consists of a network interface card, manual, software and key card, costs $1,095. The User Kit, containing only an interface card, costs $395, while a Starter Kit with cabling to interconnect three network stations sells for $95.

Quadram, 4355 International Blvd., Norcross, Ga. 30093.

Continued on Preview/44

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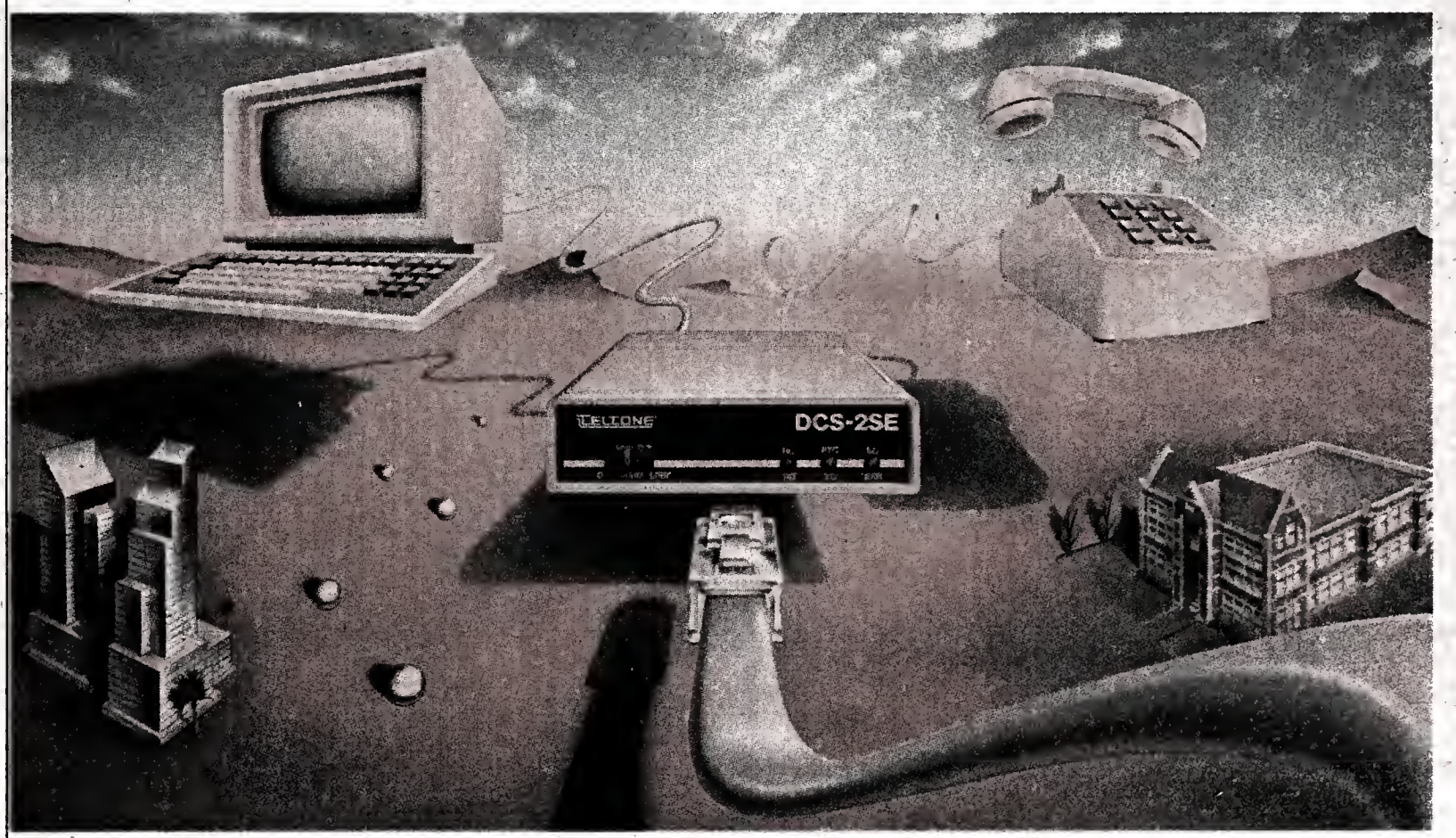

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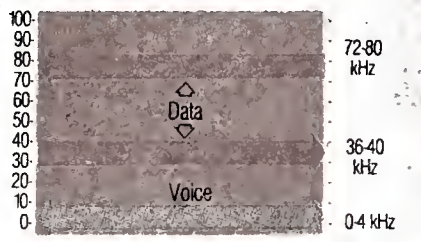

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NCC Preview

Microcomputers at NCC

Continued from Preview/43

SHARP ELECTRONICS CORP.
Booth 4305

Sharp Electronics Corp. will showcase the PC-1350 pocket computer that includes a four-line display and 16K-byte expansion random-access memory (RAM) card.

The computer comes with 5K bytes of RAM plus 40K bytes of read-only memory that contains Sharp's Basic language, Help function, graphics, machine language support as well as SIO software.

The PC-1350 costs $195, the vendor said.

Sharp Electronics, 10 Sharp Plaza, Paramus, N.J.

JUKI OFFICE MACHINE CORP.
Booth 6305

Juki Office Machine Corp. will be displaying five printers for micros and a software package that allows the Apple Computer, Inc. Macintosh to use Juki printers.

The 5510 dot matrix printer prints 180 char./sec. in draft mode and 30 char./sec. in near-letter quality mode. It is IBM and Epson America, Inc. compatible and has a 3K-byte buffer memory. The 5510 costs $582 for a serial ported version and $499 for a parallel port.

The 6000 letter-quality daisywheel printer prints 10 char./sec. and comes with either a Centronics Data Computer Corp. parallel or an RS-232C serial interface. It costs $295.

The 6100 letter-quality daisywheel printer reportedly performs word processing functions such as underscoring, boldface, superscript and subscript. It comes with a parallel interface for $599 or with a serial interface for $658.

Another daisywheel printer, the 6200, has a maximum print speed of 30 char./sec. and also comes with either serial or parallel interfaces. The serial version costs $804, and the parallel version costs $745.

The 6300 letter-quality daisywheel printer has word processing functions and graphics. The unit prints at 40 char./sec. and costs $995.

The company will also exhibit its Letterprint software that allows the Macintosh computer to work in conjunction with Juki's 6100 or 6300 printers. The Letterprint kit costs $75, or $95 with cable included.

Jeff Einstein, author of "Einstein's Computer Guides," will be at the Juki booth July 15 from 1 p.m. to 4 p.m. and July 16 from 2 p.m. to 4 p.m. giving away copies of his various computer guides.

Juki Office Machine, 299 Market St., Saddle Brook, N.J. 07662.

VERBATIM CORP.
Booth 5405

Verbatim Corp. will show prototypes of an erasable read/write optical disk and a disk drive, which are currently in the development phase. The demonstrations will take place on all four days of the National Computer Conference.

The 3½-in., thermomagneto-optical disk is said to store a minimum of 40M bytes of formatted information.

The Monday and Tuesday demonstrations will be hosted by Geoff Bate, Verbatim's senior vice-president of engineering. Ingolf Sander, chief scientist of the company's new storage technology department, will host demonstrations Wednesday and Thursday.

Demonstrations will take place all four days at 10:30 a.m. and 1 p.m. and at 3 p.m. Monday, Tuesday and Wednesday.

Verbatim, P.O. Box 3477, 323 Soquel Way, Sunnyvale, Calif. 94088.

MEGADATA CORP.
Booth 4411

Megadata Corp. will exhibit its 8300 series of Unix processors including the Model 7 stand-alone data

Continued on Preview/46

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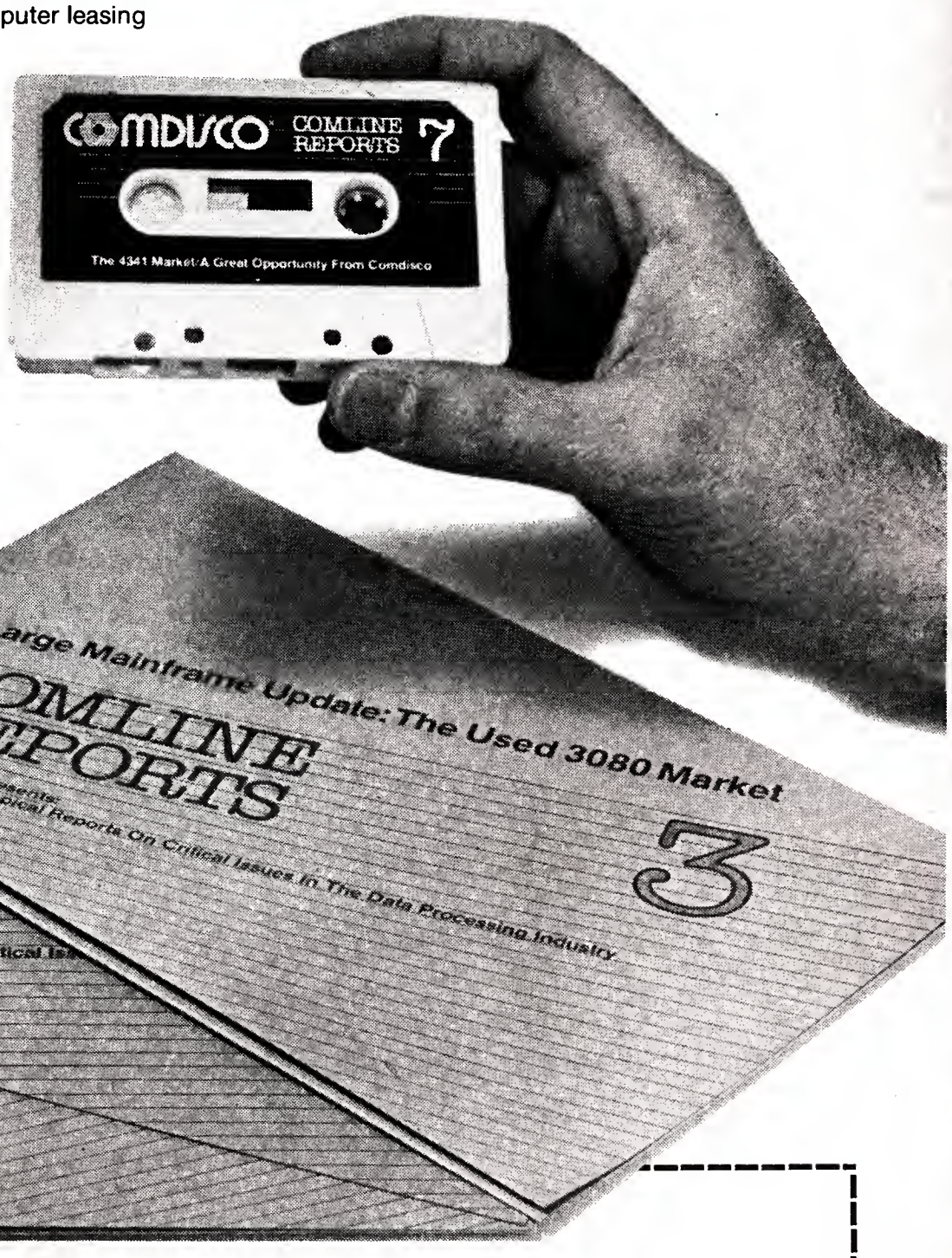

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Microcomputers at NCC

Continued from Preview/44

processing system for one to eight users.

The basic system is said to contain two RS-232 ports, a 26M-byte Winchester disk, a 360K-byte floppy disk, 512K-bytes of random-access memory (RAM) and the Unisoft System Corp. Uniplus+ operating system, derived from AT&T Unix Systems III and V.

A two-port Unix-based system costs less than $5,000 and can be expanded to eight ports and 2M bytes of RAM for under $6,000.

Megadata, 35 Orville Drive, Bohemia, N.Y. 11716.

KEY TRONIC CORP.
Booth 5605

Key Tronic Corp. will exhibit the KB5153 touch-pad keyboard for the IBM Personal Computer, Personal Computer AT and compatibles.

Three printing modes, including cursor key, mouse and graphics and a function key mode, are standard, according to the vendor.

Cursor key mode is said to convert finger or stylus motion into cursor key codes identical to keyboard input. In mouse mode, stylus or finger movement reportedly sends position changes to the host, where they are interpreted by a software driver as if they came from a mouse.

Graphics mode sends a digitized point-of-touch to the host where driver software translates the data and moves a screen pointer to the corresponding monitor location. Function key mode divides the touch-pad surface into areas that each represent an operator-selected string of characters.

The KB5153 lists for $399.95.

Key Tronic, P.O. Box 14687, Spokane, Wash. 99214.

PREH ELECTRONICS INDUSTRIES, INC.
Booth 1227

Preh Electronics Industries, Inc. will show keyboards and graphics tablets.

Graphic Commander 106, a combination keyboard and graphics tablet, costs $550; Commander PC-I, an IBM Personal Computer-compatible keyboard, costs $195; and Bitmap 12, a graphics tablet with zoom functions, costs $350.

Preh Electronics Industries, 5665 Howard St., Niles, Ill. 60648.

ENTER COMPUTER, INC.
Booth 2936

Plotters, a mouse and lettering software will highlight Enter Computer, Inc.'s booth.

The six-pen Sweet-P Model 600 plotter includes 14 in./sec. plotting speed, RS-232 and parallel interfaces, 18 internal English and foreign language character sets and 1.5K-byte buffer memory storage.

Like its single-pen predecessor, the Sweet-P Model 100, the Model 600 can be used with many systems compatible with Apple Computer, Inc., IBM Personal Computer and CP/M machines. The Model 600 also is compatible with the Hewlett-Packard Co. Graphics Language.

The Sweet-P mouse reportedly uses an independent suspension system and leaf springs that keep a constant load on the X-Y drive wheels. It is available for the IBM Personal Computer, Personal Computer XT and AT, 3270 Personal Computer and compatible processors.

Typ-Set, a high-resolution, presentation-graphics-quality lettering system, is said to provide six fonts and let users place 100 lines and save all data for each job file. It runs with a 192K-byte, dual-floppy IBM Personal Computer and compatible computers.

Prices are $1,095 for the Model 600 plotter, $395 for the Model 100, $179 for the mouse and $299 for Typ-Set.

Enter Computer, 6867 Nancy Ridge Drive, San Diego, Calif. 92121.

HOUSTON INSTRUMENT
Booth 5063

Houston Instrument will exhibit digital plotters and graphics digitizers.

The PC Plotter, a four-pen plotter for personal computers, uses the vendor's DM/PL plotting language. The PC Plotter 595 lets users produce 8½- by 11-in. graphics; the PC Plotter 695 produces both 8½- by 11-in. and 11- by 17-in. graphics.

The DMP single-pen plotter reportedly offers speeds up to 4.2 in./sec., and 8½- by 11-in. and 11- by 17-in. graphics plotting. It is said to generate circles, arcs, ellipses and general curves automatically as well as clip, window, viewport and scale to size.

Continued on Preview/50

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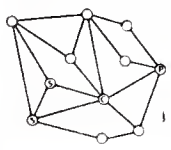

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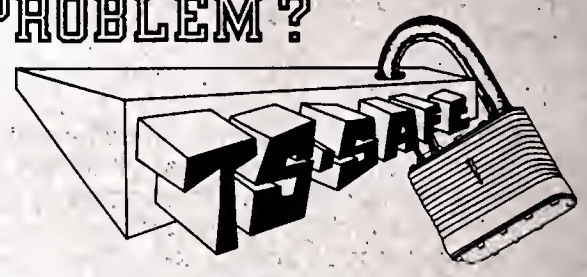

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- Lear Siegler ADM-3A*
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The IBM 3163 with Plug-in Cartridge

And, as if that weren't enough, we're also announcing

The sharp 8 x 16 character matrix helps make for easier reading and fewer operator errors.

a second new ASCII display station with even higher function—the IBM 3163.

Outwardly, these two new displays look alike. But the 3163, in addition to its built-in emulation of the IBM 3101 Model 881, also offers the ability to emulate the DEC VT 52 and VT 100* by means of a unique plug-in cartridge.

And while you'll like the power and flexibility of the 3161, for your high-function applications the 3163 goes even further. For example, a 7,680-character buffer and up to three windows enable you to view and modify portions of different host data bases. The 3163 lets you redefine and even recap the keys.

On both displays the setup is menu-guided and written in plain English, so it can be done easily and quickly. The point is, both are designed to improve your user productivity.

Very Attractive Prices

The price per terminal is $695 for the 3161 and $1,095 for the 3163. Quantity discounts are available. What's more, IBM maintenance offerings start as low as $35 per year per terminal for customer carry-in repair.

Now there's a new family of ASCII displays with the quality, service and support IBM is famous for. Both displays are available through IBM Authorized Distributors and IBM marketing representatives.

FEATURES	3161	3163
Lines x Characters	25 x 80	25 x 80
Double-sized chars	No	Yes
Line drawing chars	24	24
Vertical scroll	Jump	Jump/ Smooth
Definable function keys	24	24
Windowing	No	Yes
Partitioning	Horiz	Vert/Horiz

Call 1 800 IBM-2468, Ext. LE/90 for the name of an Authorized Distributor near you.

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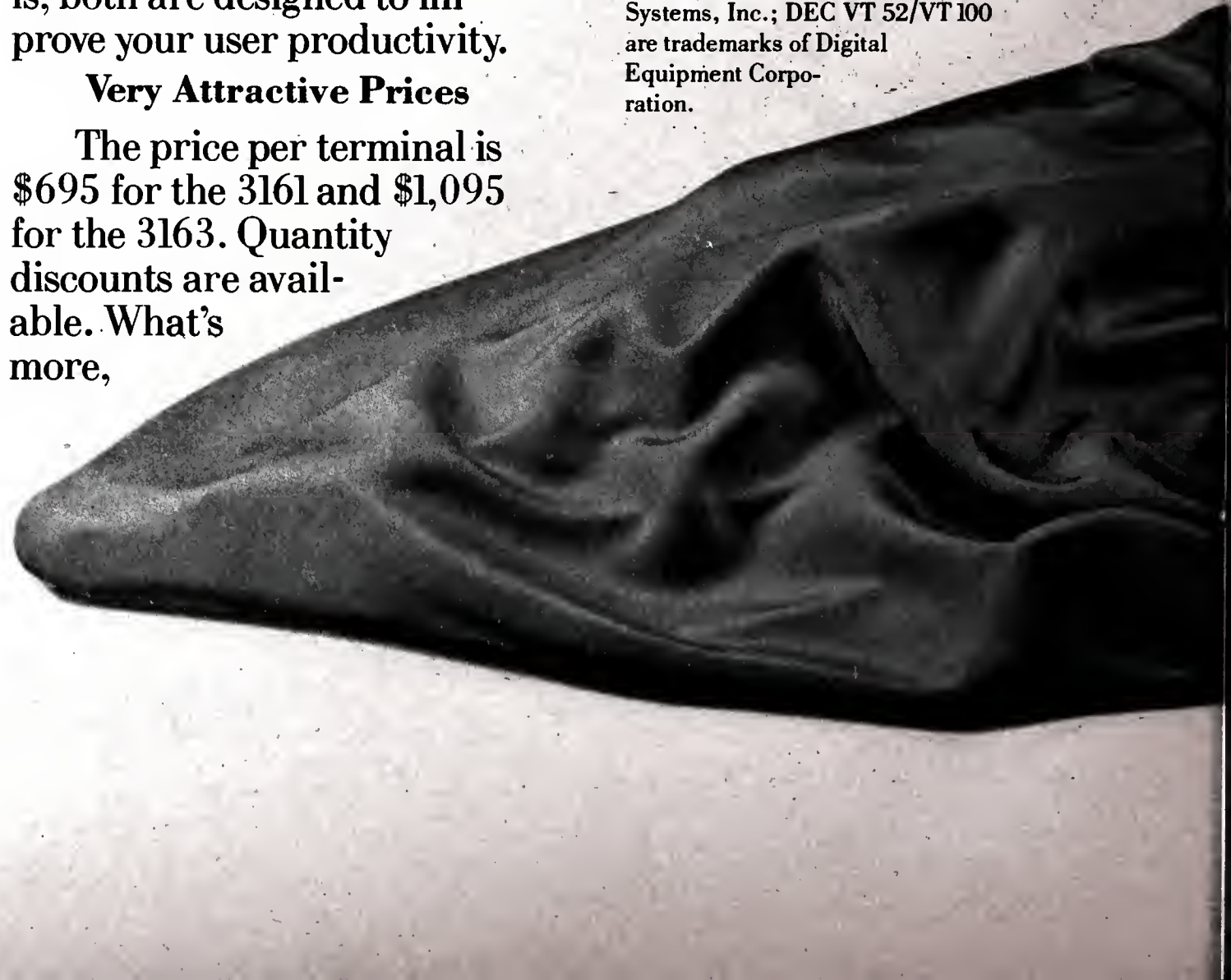

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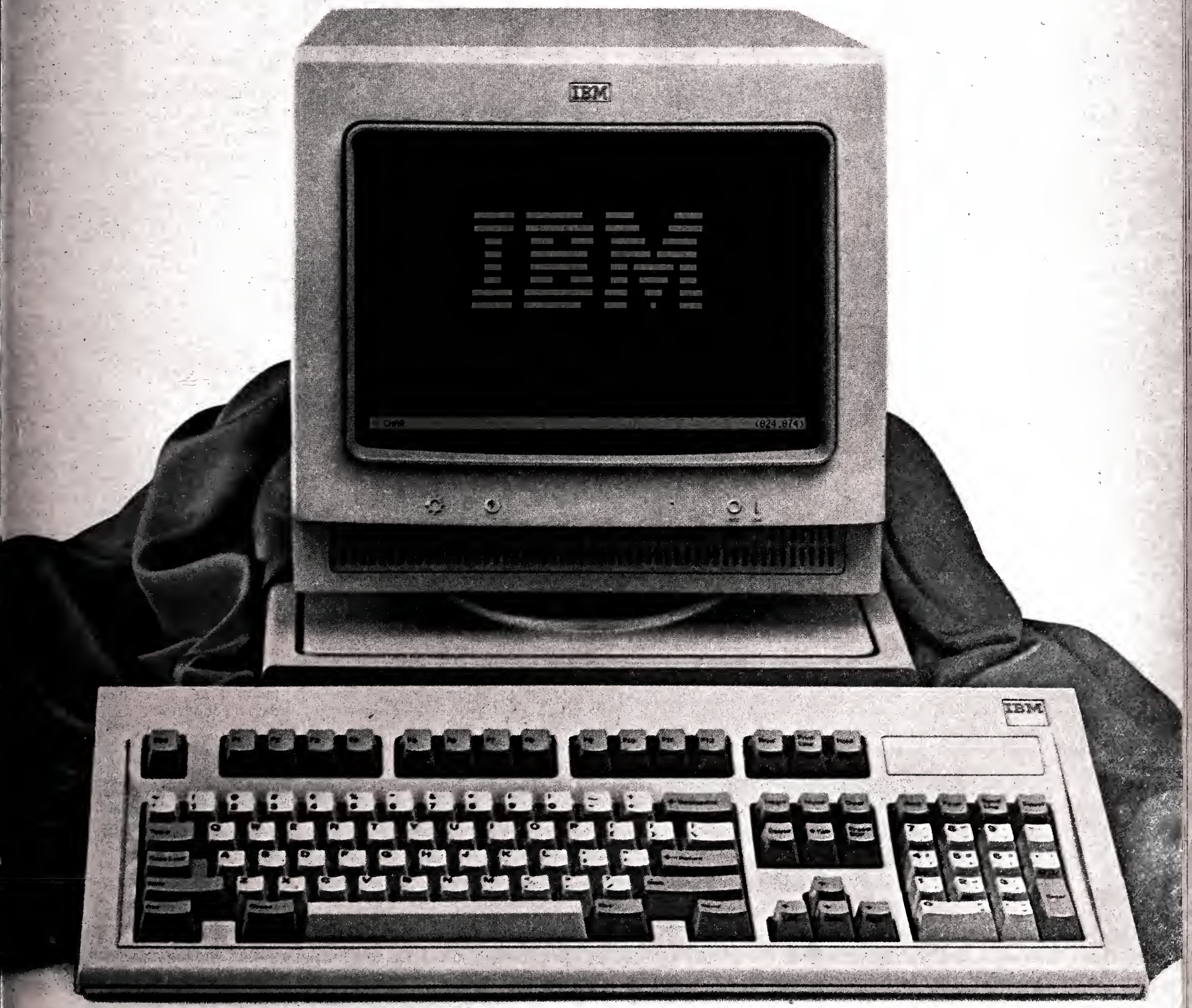

The IBM 3161 ASCII Display Station

NCC Preview

Microcomputers at NCC

Continued from Preview/46

The intelligent DMP-41/42 cut-sheet plotters automatically generate circles, ellipses and curves, the vendor said. The 14-pen DMP-51/52 MP series plotters reportedly provide 0.001-in. resolution, maximum plotting speed of 22 in./sec. and constant velocity control to ensure uniform inking regardless of pen movement angle.

PC Pad is said to function as a digitizer and mouse under software control and interface via an RS-232C port.

Providing 0.005-in. resolution, the PC Pad can address more than one million points on a computer screen, according to the vendor.

Hipad desktop digitizers reportedly can send up to 100 coordinates in one second.

Prices are $695 for PC Plotter 695, $995 for the DMP-40 plotter, $2,995 for the DMP-41/42 series plotters, $5,995 for the 51/52 MP series plotters, $495 for PC Pad, $840 for the Hipad DT-11 and $920 for the four-button cursor version of Hipad DT-114.

Houston Instrument, 8500 Cameron Road, Austin, Texas 78753.

DIGITRAN
Booths 1657, 1658

Digitran will exhibit an IBM Personal Computer AT keyboard that reportedly is also compatible with the Personal Computer and Personal Computer XT.

The keyboard is available with tactile or linear keys, a curved design and 0.15-in. travel.

The single-quantity price is $195 for keyboard, enclosure and cable.

Digitran, 3100 New York Drive, Pasadena, Calif. 91107.

COMPSOL CORP.
Booths 4059, 4061

Compsol Corp. will present a solid-state disk emulator for the IBM Personal Computer, Personal Computer XT and AT that is said to transfer data at 5M byte/sec.

Called Quick Byte, the system reportedly can be expanded from 1M byte to 4G bytes of random-access memory using one bus slot and can host up to four computers.

Quick Byte with 1M byte of RAM costs $1,495.

Compsol, 318 Montgomery St., Alexandria, Va. 22314.

MINISCRIBE CORP.
Booth 2317

Miniscribe Corp. will display its 8000 series of 3½-in. disk drives plus its 3000 and 6000 series of 5¼-in. drives.

Model 8425 reportedly provides 25.6M bytes of storage; Model 8212 offers 12.8M bytes. Both models reportedly feature 68-msec access times and 5M bit/sec. data transfer rates.

Miniscribe, 1861 Lefthand Circle, Longmont, Colo. 80501.

MOTOROLA SEMICONDUCTOR PRODUCTS, INC.
Booth 6329

Motorola Semiconductor Products, Inc. will show the VMESystem 1000 family of rack-mounted OEM microcomputer systems.

The systems provide a VME chassis with card cage, 400W power supply, 15M-byte or 40M-byte hard disk drive and 1M-byte floppy disk drive.

Other features reportedly include multiuser capability and Motorola's Versados and System V/68 support.

Motorola Semiconductor Products, 725 S. Madison Drive, Tempe, Ariz. 85281.

KUSTOM ELECTRONICS, INC.
Booth 3457

Kustom Electronics, Inc. will present the Sunflower MS 10/10 removable hard-disk system.

A dual 10M-byte unit, the MS 10/10 is said to be compatible with the IBM Personal Computer and the Novell, Inc. and 3Com Corp. networks. MS 10/10 is priced at $3,395.

Kustom Electronics, 8320 Nieman Road, Lenexa, Kan. 66214.

ALPS ELECTRIC (USA), INC.
Booth 6415

Alps Electric (USA), Inc. will exhibit 3½- and 5¼-in. disk drives and data input devices.

The 3½-in. rigid disk drives provide 10M- or 20M-byte storage capacities; the 3½-in. flexible drives have 512K-byte and 1M-byte storage capacities; 5¼-in. rigid disk drives offer 10M-, 20M- and 40M-byte capacities.

Alps Electric, 3553 N. First St., San Jose, Calif. 95134.

VIDEX, INC.
Booths 4169, 4171

Videx, Inc. will display the Mail Center, an information transfer program for the Apple Computer, Inc. Appletalk personal computer network.

Mail Center software for two Macintosh computers costs $299; the price is $499 for use with six Macintosh systems.

Videx, 897 N.W. Grant Ave., Corvallis, Ore. 97330.

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TATUNG COMPANY OF AMERICA, INC., 2850 El Presidio, Long Beach, California 90810.

NCC Preview

Communications at NCC

M/A-COM LINKABIT, INC.
Booth 2321

M/A-Com Linkabit, Inc. will display its IDX-3000 local networking products.

The IDX-3000 local communications network allows users to switch between computer resources automatically, providing nonblocking, full-duplex asynchronous communication for up to 3,072 lines at rates of up to 19.2K bit/sec.

Other features include logical addressing of lines and resources and the ability to queue and hold user connection requests, establish a second connection and return to the first connection.

An IDX-3000 local communications network system costs between $150 and $200 per port; multiplexers range from $3,000 to $4,900; and TMX144 trunkmasters cost between $2,500 and $3,500.

M/A-Com Linkabit, 3033 Science Park Road, San Diego, Calif. 92121.

CODEX CORP.
Booth 5541

Codex Corp. will present the 6240 Digital Transmission Multiplexer (DTMX), said to integrate voice, data and digital image applications for transmission over a single link at rates from 56K bit/sec. to 2.04M bit/sec.

The time-division multiplexer will accommodate up to 64 data channels or 64 voice channels. It can be programmed to reconfigure networks from a central site; users can redefine parameters and reallocate aggregate bandwidth, the vendor said.

Prices begin at $14,000 per unit.

Codex 20 Cabot Blvd., Mansfield, Mass. 02048.

INTERPRETER, INC.
Booth 5315

Interpreter, Inc. will exhibit its Interpreter CCU line of devices that reportedly allows dissimilar office automation equipment to communicate with 100% data integrity.

The CCU-4 is a four-port interpreter that provides two floppy disks with 256K bytes of store and forward capabilities. Up to four dissimilar asynchronous or synchronous systems can communicate with one another and retain the integrity of documents being exchanged. The CCU-W is a six-port interpreter with a Winchester disk providing 10M bytes of store and forward capabilities.

Other features include password protection for screen access and a menu access control facility that tells the operator what documents are queued. Prices are $12,490 for the CCU-4 and $18,990 for CCU-W.

Interpreter, 11455 W. 48th Ave., Wheat Ridge, Colo. 80033.

EXTEL CORP.
Booths 3157, 3158

Extel Corp. will exhibit the Comwriter Jr. message communications terminal that reportedly lets users send messages over ordinary telephone lines, dedicated Telex or private-wire networks.

According to the vendor, the terminal also can access Telex, TWX and other message communications services for electronic mail applications.

Comriter Jr. comes with a printer, modem, text editor and autodial keys that are said to allow single-key message transmission over common carrier services.

Prices start at $1,300.

Extel 4065 Commercial Ave., Northbrook, Ill. 60062.

Continued on Preview/52

Low-cost, tough and quiet. ST Series printers from SSI.

A small, quiet printer system with more output for the dollar. Printer users have been waiting for this perfect combination of ideal qualities. Now Southern Systems has it. The ST Series—in either 450 or 900 lpm speeds—says YES to many user criteria.

YES

- ☑ Do the ST printer systems offer a choice of speeds . . . 450 or 900 lpm?
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- ☑ Are they reliable (tough) enough to *eliminate preventive maintenance*?
- ☑ Do they offer operator-friendly features such as easily changed bands, membrane touch controls, form length select switch?
- ☑ Is the printing near letter-quality?
- ☑ Diagnostic display? Internal self-test?
- ☑ Long-life ribbon cartridge?
- ☑ Does SSI guarantee compatibility with my computer? (Whether it's IBM, PC LANs, DEC, DG, TI, HP, etcetera.)
- ☑ Is nationwide service available?
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NCC Preview

Communications at NCC

Continued from Preview/51

LOCAL DATA, INC.
Booth 2857

Three stand-alone protocol converters will be displayed at the Local Data, Inc. exhibit.

The Versalynx Rack is a rack-mount configuration of the Versalynx 3278 coaxial deconverter. The rack-mount version contains up to 16 6- by 12-in. cards, individually fused and designed to enable insertion or removal while the rack is under power.

Trulynx/3270 software is said to execute as an application program under Microsoft Corp.'s MS-DOS or IBM's PC-DOS, emulating the file-transfer mode of IBM's 3278 or 3270 Personal Computer control program.

Barelynx/3287, Barelynx/3278 and Barelynx/VL 78 are board-only versions of the Interlynx/3287 NP printer controller converter, the Interlynx/3278 deluxe coaxial controller converter and the Versalynx Model 3 coaxial deconverter, the vendor said.

The Versalynx Rack costs $2,150. Other prices are not available.

Local Data, 2771 Toledo St., Torrance, Calif. 90503.

DIGITAL COMMUNICATIONS ASSOCIATES, INC.
Booth 5669

Digital Communications Associates, Inc. (DCA) will exhibit data communications networking systems and microcomputer-to-mainframe communications products including Netlink high-speed time-division multiplexers, the Irma micro-to-mainframe interface board and the Network Management System software package.

There are three Netlink multiplexers.

Netlink I is a bit-synchronous time-division multiplexer that is said to provide voice, data and compressed video transmission at speeds of up to 1.544M bit/sec.

Switching Netlink adds the ability to assign individual channels or groups of channels to various network destinations.

Netlink II adds support for traditional drop-and-insert and bypass applications, redundancy of power, logic and T-carrier modems, support of independent trunk clocks and D4 framing capability.

The Irma board reportedly provides communications facilities between a personal computer and a mainframe.

The Network Management System is a package that lets an IBM Personal Computer XT or AT serve as an intelligent monitoring and reporting device when attached to DCA's Series/300 network processors.

Prices are $4,195 each for Netlink I and II; $1,195 for Irma and $9,995 for the Network Management System.

DCA, 303 Technology Park, Norcross, Ga. 30092.

AMP, INC.
Booth 1119

Amp, Inc. will show a four-position data connector that includes self-shorting contacts required for IEEE 802.5 token-passing ring networks.

The hermaphroditic connector permits axial, right-angle or 45-degree cable entry and contains a locking device to prevent accidental disengagement.

Selectively plated gold contacts are rated for 1A, maximum, at 30V ac.

Shielding performance is specified to 1 GHz, according to the vendor.

Amp, P.O. Box 3608, Harrisburg, Pa. 17105.

TELENEX CORP.
Booth 4505

Data communications diagnostic and performance analysis devices will highlight Telenex Corp.'s exhibit.

Autoscope monitors and interprets line activity, detects line and protocol errors automatically, monitors and provides graphic statistical analyses of performance and emulates any network element, according to Telenex.

Portascope 1000 reportedly provides removable, interchangeable test application cartridges. These cartridges allow the device to adapt modularly and specialize on any protocol, in turn letting the service engineer change from one interface and break out to another, the vendor said.

Autonex is said to extend the 50-ft limitation of the RS-232 data set cable to over 1,000 ft.

A cable converter unit passes all control, clock and data leads of the RS-232 interface to distances of more than 1,000 ft at speeds of up to 19.2K bit/sec., the vendor said.

Telenex, P.O. Box 249, 502 Pleasant Valley Ave., Moorestown, N.J. 08057.

TELTONE CORP.
Booths 1557, 1558, 1559

Teltone Corp. will display the DCS-2SE data communications system said to eliminate the need for cables between terminals, peripherals and the host computer.

The system sends either synchronous or asynchronous data over existing phone pairs for up to four miles.

Voice and data can be transmitted simultaneously, according to a spokesman.

Asynchronous speeds reportedly can reach 9.6K bit/sec.; synchronous speeds range from 300 bit/sec. to 9.6K bit/sec.

Teltone, P.O. Box 657, 10801 120th Ave. N. E., Kirkland, Wash. 98033.

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Some data network control systems offer diagnostics or response time statistics. Or a statistically averaged data base for planning functions.

The Emcom NCS70/30 offers more. 100% transaction monitoring. Real-time performance graphs. Diagnostic line traces and traps for troubleshooting. Plus host-generated capacity planning and other reports for total control of a data communications network.

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NCC Preview

Systems & Peripherals at NCC

FLEXIBLE COMPUTER CORP.
Booth 6321

A demonstration of the Flex/32 multicomputer will highlight Flexible Computer Corp.'s booth.

The Flex/32 consists of two to 20 32-bit superminicomputers, each with its own memory, operating system and I/O (VMEbus).

Each 32-bit computer can be programmed by the user, the vendor said. Software includes AT&T Unix System V, a concurrency simulator for testing parallel systems, the Multicomputing Multitasking Operating System, Concurrent C, Concurrent Fortran and Ada.

The aggregate bus bandwidth of the 36 buses in each Flex/32 cabinet is 696M bytes per second, according to the vendor.

The basic system, which consists of two computers, costs $126,000.

Flexible Computer, Building 8, 1801 Royal Lane, Dallas, Texas 75229.

BELL & HOWELL CO.
Booth 1538

Bell & Howell Co. will exhibit COM Print 6000, a computer output microfilm print and duplicating system.

COM Print 6000 is an on-line system that reportedly produces complete master and duplicate fiche printouts in one step.

Compatible with IBM and plug-compatible mainframes, the system can generate a 1,000 page report for less than $1 in fewer than 22½ minutes, a spokesman said.

Bell & Howell, 16691 Hale Ave., Irvine, Calif. 92714.

VOTAN
Booth 3317

Voice terminals and a voice management system will highlight Votan's exhibit.

The VTR 3270 is said to allow 3278 terminal users to add voice control to their applications.

The VTR 6050 terminal provides local 3½-in. floppy disk storage that can be controlled by the host or a locally connected terminal. Each floppy provides 320K bytes of storage for saving messages and other voice files.

This terminal also offers continuous speaker-dependent recognition to allow individuals to speak to a computer in a normal conversational flow, the vendor said.

The Voice Management System (VMS) is said to provide continuous voice recognition, voice store and forward and telephone interfacing capabilities for up to eight independent voice channels running simultaneously.

VMS also includes 5¼-in. Winchester and floppy drives for storing voice messages and voice applications programs.

Votan, 4487 Technology Drive, Fremont, Calif. 94538.

DATAGRAPHIX, INC.
Booth 5553

Datagraphix, Inc. will demonstrate Computer Output Management (COM) systems including the Mini-Autocom Model III recorder, Autocom XR microfilm recorder, Aris II microfiche recorder and Datagraphix laser printer.

The Mini-Autocom Model III recorder includes an IBM Personal Computer that provides operator interface, message display and diskette storage features.

The recorder reportedly converts computer-generated tapes into cut, dry nonreversal or optional reversal microfiche for immediate diazo or vesicular duplication.

The on-line Autocom XR is configured as a 3211 line printer that interfaces directly with IBM Series 370, Series 303, 308 or 43 computers plus plug-compatible mainframes.

Autocom XR processes data into 105mm, 82½mm or 16mm roll microfilm for off-line processing. The 105mm film is titled and indexed at an average speed of one fiche per minute, according to the vendor.

Aris II reportedly uses raster scan laser-imaging and dry heat development processing to produce titled and indexed microfiche at speeds of up to 12,000 line/min.

The system is configured as a 3211 printer and interfaces with IBM 360/25 and higher models, Series 370, 303 and 43 computers plus Amdahl Corp. V6 and other IBM plug-compatibles.

An Interlink transport option to cut-fiche COM systems connects the recorder to the duplicator and automatically carries cut silver original microfiche from the Aris II or Autocom for duplication.

The 9800 series laser printer reportedly outputs characters at speeds of up to 21,000 line/min.

Datagraphix, P.O. Box 82449, San Diego, Calif. 92138.

Continued on Preview/54

The first DBMS designed for online systems from the start, finishes first.

Compared to any other DBMS, CCA's MODEL 204 software is faster in a VM, OS, or DOS environment.

And, its productivity stays ahead of the pack even as you add more and more users. Incredibly, the MODEL 204 can support any size network from 30 to 30,000 terminals.

Like the cheetah's speed compared to other animals, the MODEL 204 was designed to be fast from the start. Because instead of being designed for batch, then retrofitted, this DBMS was specifically designed for online systems right from the start.

Impressive as its speed, is capacity. It can handle a few hundred records, or as many as 513 billion! With no limit on each record's size.

Because of its fourth generation tools, tough applications are easy to create, test, or change without affecting the database. And unlike any other DBMS, as your business data tracking requirements change, you can add or change new or existing fields without unloading, recompiling and reloading the database. A dramatic savings of time and manpower.

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NCC Preview

Systems & Peripherals at NCC

Continued from Preview/53

XYLOGICS, INC.
Booth C4175

Xylogics, Inc. will exhibit the 451 disk controller for IEEE 796 multibus applications and two 32-bit bus products, the 751 VME-bus storage module drive (SMD) disk controller and 772 VME-bus ½-in. tape controller.

The Model 451 disk controller can address up to 16M bytes of memory and control up to four enhanced SMD disk drives per board at data transfer speeds up to 2.4M byte/sec., the vendor said.

The 751 disk controller supports an industry-standard SMD interface disk drive. The controller also provides VME address and data support, allowing users to select in 8-, 16- or 32-bit modes, the vendor said.

The 772 tape controller is said to handle industry-standard, formatted ½-in. tape interfaces and support tapes ranging from start/stop models at 12½ in./sec. to group-coded recording streaming models up to 200 in./sec.

The 451 peripheral controller costs approximately $1,500. Prices for the 751 disk controller range from $1,600 to $2,700 and for the 772 tape controller from $1,300 to $2,000.

Xylogics, 144 Middlesex Tnpk., Burlington, Mass. 01803.

C. ITOH ELECTRONICS, INC.
Booth 4431

C. Itoh Electronics, Inc. has added a 22 char./sec. print mode to its Model 8510 80 char./line and Model 1550 136 char./line serial dot matrix printers.

This print speed provides near-letter-quality output, the vendor said. The three print modes can be selected from the front panel or by software.

The single-unit price for the 8510T is $550; the 1550T is priced at $769. The color models are priced at $650 for the 8510TC and $869 for the 1550TC.

C. Itoh Electronics, 5301 Beethoven St., Los Angeles, Calif. 90066.

GENERAL OPTRONICS CORP.
Booths 2244, 2245

General Optronics Corp. will exhibit the Holoscan 40, a 40 page/min nonimpact laser printer said to support up to 25 workstations in a multitask environment.

The printer provides 300 by 300 dot/in. resolution and a volume range of 45,000 to 60,000 print/mo, a spokesman said. A plain paper and dry toner xerographic system is said to allow printing on most standard bond and letterhead, label stock and transparencies in portrait and landscape modes.

Multiple downloadable fonts can be interspersed on a single page, according to the spokesman.

Single-unit prices start at $22,500.

General Optronics, 375 Park Ave,. New York, N.Y. 10152.

CENTRONICS DATA COMPUTER CORP.
Booth 4955

Centronics Data Computer Corp. will exhibit dot matrix and line printers.

The dot matrix printers include the Great Little Printer for micros, priced at $299; the Horizon series for IBM Personal Computers and compatible processors, priced from $699 to $899; the Model 240 Printstation letter-quality printer, priced at $1,495; the Model 250 Printstation for workstations and micros, priced at $1,295; and the Printstation 350 series letter-quality printers, priced between $2,195 and $3,150, the vendor said.

Centronics will also show line printers like the TIP series dot matrix line printers, ranging in price from $5,400 to $6,900; the E-Series Model III band line printer, priced at $16,800; and the Linewriter series, priced between $4,885 and $6,595.

Centronics, 1 Wall St., Hudson, N.H. 03051.

ANN ARBOR TERMINALS, INC.
Booth 3229, 3230

Ann Arbor Terminals, Inc. will showcase the VXL multihost, multiwindow terminal that can work with up to four hosts simultaneously.

Users reportedly can switch from one host to another with one keystroke, even while receiving results from other hosts in other windows.

The VXL provides 20K bytes of local display memory, which reportedly can be divided into up to eight pages, each of arbitrary width and height, to a maximum of 255 columns and 512 lines. Users can dynamically connect and disconnect any page to any host and switch the keyboard from host to host, according to the vendor.

Windows may be positioned so all are visible or are fully or partially overlapped. Each window is a view port into its underlying page and may be moved or changed in size and shape without affecting underlying data, the vendor said.

VXL screen density is dynamically variable from 80 to 160 col. and from 36 to 60 lines, according to the vendor.

The VXL lists for $2,795.

Ann Arbor Terminals, 6175 Jackson Road, Ann Arbor, Mich. 48103.

Continued on Preview/56

MAN SAVED FROM A SEA OF PAPER

Huge oceans of information can be standardized into computer output microfiche (COM) that takes up less than 5% of equivalent paper space.

And it's simply the most cost-effective storage/reproduction medium available.

For example, a 1,000-page report using old reproduction methods would cost $30.00 and take 1 hour to reproduce. An NCR COM can perform the equivalent task in 15 minutes for $1.25!

NCR's COM systems can be a real life saver.

Computer Output Microfiche

NCR

Micrographic Systems Division

Micrographic Systems Division, 520 Logue Avenue, Mountain View, CA 94043, (415) 962-7400, (800) 227-9964

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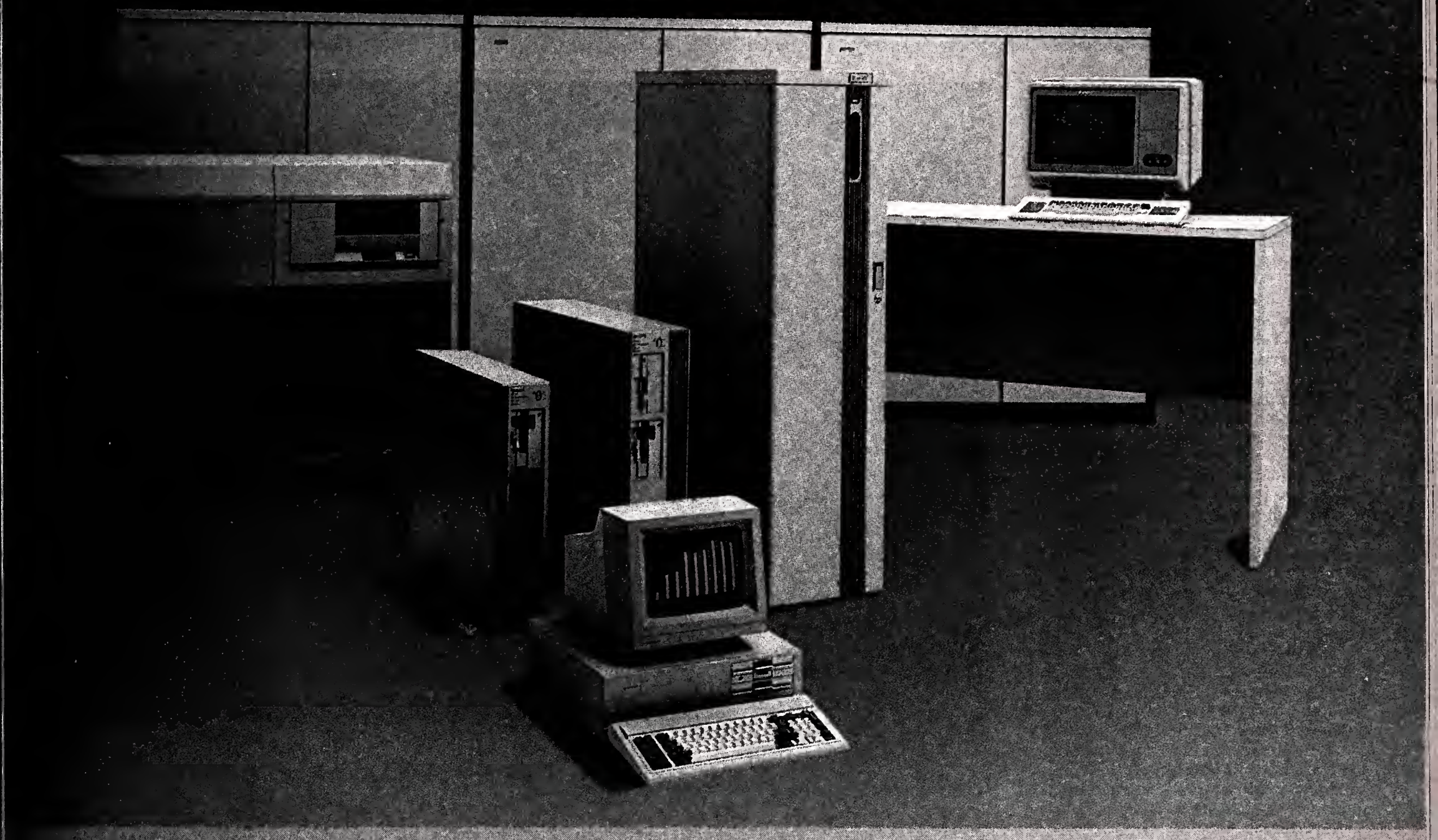

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SPERRY

See Sperry at the NCC Show, July 15-18, Booth 5629

NCC Preview

Systems & Peripherals at NCC

Continued from Preview/54

PRINTEK, INC.
Booth 2124

A demonstration of the Model 930/DD forms printer will highlight Printek, Inc.'s booth.

The Model 930/DD contains a bottom-entrance vertical feed of up to six-part continuous forms. Tractors beneath the printer reportedly provide a positive paper feed without delamination between copies for accurate print positioning.

Print speed is 200 char./sec. for data processing applications, 80 char./sec. for letter-quality printing.

No prices have been established yet, the spokesman said.

Printek, 1517 Townline Road, Benton Harbor, Mich. 49022.

ELECTRONIC INFORMATION TECHNOLOGY, INC.
Booths 1060, 1062

Electronic Information Technology, Inc. (EIT) will exhibit a monochrome image processing device that converts hard-copy materials into electronic files that can be used on personal computers.

The EIT Personal Scanner (EIT-PS) automatic graphics digitizer and text input device reportedly provides optical character recognition and image processing capabilities.

EIT-PS hardware consists of a desktop scanner and cable, plus interfaces to IBM Personal Computers and Personal Computer XTs and Apple Computer, Inc. and Motorola, Inc. 68000-based microcomputers.

The single unit price is $2,487.

EIT, 373 Rte. 46 W., Fairfield, N.J. 07006.

TATUNG CO.
Booths 6277, 6380

An IBM-compatible color monitor for text and graphics displays will debut at Tatung Co.'s exhibit.

The CM-1380 monitor reportedly provides a resolution of 640 horizontal dots by 200 or 350 vertical lines, with scan frequency at 21.85 KHz or 15.75 KHz.

The unit offers 16 colors at 15.75 KHz and 64 colors at 21.85 KHz. The display is switch selectable from color screen to an all-green screen for word processing, according to the vendor.

Designed for use with the IBM Enhanced Graphics Adapter, the CM-1380 costs $849.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

COMPUTER MEMORIES, INC.
Booth 6271

Computer Memories, Inc. will display the CM 4000 series of disk drives, including the 26.6M-byte CM 4426 drive.

The CM-4426 is said to provide a typical access time of 40 msec and to use high-output Winchester-type read/write heads.

In OEM quantities, the half-height CM 4426 costs $650. A delayed motor start option is available, according to the vendor.

Computer Memories, P.O. Box 2740, 9216 Eton Ave., Chatsworth, Calif. 91311.

TRUE DATA CORP.
Booths 3709, 3710

A wall-mount version of the Source Data Terminal (SDT) for shop floor data collection and TDC Perform, a manufacturing software package, will bow at True Data Corp.'s exhibit.

The wall-mount SDT can be used in environments with limited work space. It reportedly provides an employee identification badge reader, an optical card scanner, 32-col. LCD and 16-key data input touch pad.

SDT is built around a Rockwell International Corp. 6502A microprocessor with 4K bytes each of random-access memory and erasable, programmable read-only memory. Up to 64 user-defined prompts and 20 transactions for later communications to the computer may be stored, according to the vendor.

TDC Perform is said to offer communications polling, file editing, reporting and forms design.

Designed to run on IBM Personal Computer XTs and ATs operating under Microsoft Corp.'s MS-DOS, TDC Perform lets users define up to 32 relational data bases with up to 32 different forms within each data base.

SDT costs $1,995. TDC Perform sells for $8,295, with individual modules priced separately.

True Data, 17092 Pullman St., Irvine, Calif. 92714.

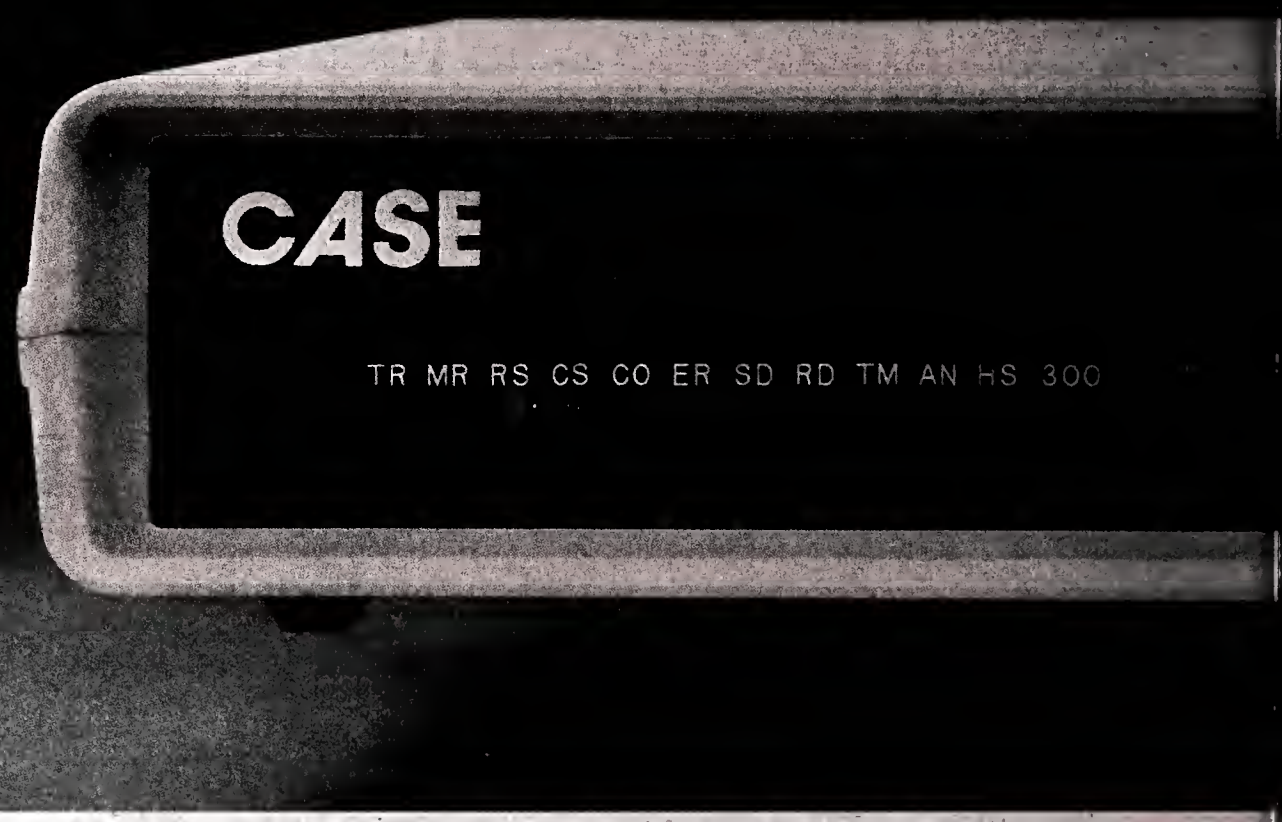
MICRO TECHNOLOGY, INC.
Booth 2344

Micro Technology, Inc. will show Digital Equipment Corp.-compatible disk controllers and subsystems, including the Microsafe streaming-tape cartridge upgrade kit and the MD4000 series of subsystems.

Microsafe addresses the backup deficiencies in DEC's MicroPDP-11, MicroPDP-11/73 and Microvax by replacing those systems' dual floppy drives with a half-height streaming-tape cartridge drive and half-height floppy drive, according to the vendor.

The MD4260 is a 40M-byte Winchester subsystem that includes a

SPRING FORWARD.



NOW THERE'S A NEW 1200 BPS 2400 BPS AND FALLS BACK

For companies already populated by 300 and 1200 bps modems, the new generation of 2400 bps modems does not always offer welcome relief.

Unless those new modems are Rixon 1224s from CASE.

The new Rixon 1224 modem communicates equally well at 300, 1200 and 2400 bps.

To say the least.

The Rixon 1224 also boasts full autodial capabilities, complete with a speaker and front panel volume control. It even allows switching between DDD and private lines.

It features 11 indicators, 9 switches and synch selection, all conveniently located right on the front panel.

It expresses a CASE design so advanced and compact that you can fit

USA CASE RIXON Communications, Inc., Columbia, MD, *Telephone:* (301) 381-2300, *TLX:* 89-8347
UK & Europe World Headquarters: CASE, England, *Telephone:* 0923-33500, *TLX:* 923325

NCC Preview

Systems & Peripherals at NCC

60M-byte tape for backup and the firm's Mavo5 ¼-in. streaming tape cartridge controller with QIC-02 interface.

A combination 40M-byte fixed and 10M-byte removable Winchester drive, the MD4110 emulates four RL02 drives, thereby providing 41.6M bytes of storage, the vendor said.

The MD4910 integrates two 10M-byte Winchester drives.

OEM quantity prices are $2,450 for Microsafe, $4,626 for the MD4260, $4,100 for the MD4110 and $3,365 for the MD4910, according to the vendor.

Micro Technology, 1620 Miraloma Ave., Placentia, Calif. 92670.

APPLIED INFORMATION MEMORIES
Booths 3705, 3706

Demonstrations of the Dart-130, Dart-250 and Dart-170 5¼-in. disk drives will highlight Applied Information Memories' exhibit.

The Dart-130 is said to provide 129.27M bytes of storage capacity, 18-msec average positioning time and a 9.68M bit/sec. data transfer rate.

A 250.4M-byte device, the Dart-250 reportedly offers 18-msec average positioning time and a data transfer rate of 14.5M bit/sec.

The Dart-170 is a 166M-byte disk drive that provides 18-msec average positioning time. Data transfer occurs at 9.68M bit/sec.

Applied Information Memories, 776 Sycamore Drive, Milpitas, Calif. 95035.

OPTOTECH, INC.
Booth 2924

Optotech, Inc. will show its Model 5984 optical disk drive, a 5¼-in. write-once-read-mostly storage system for personal and small business computers and workstations.

Double-sided, 400M-byte removable cartridges offer more than 200M bytes of on-line storage, the vendor said.

Other features include pregrooved media, a pointer field that links previously stored information with new data, direct-read-during-write techniques for verifying data and read/write and tracking servo systems.

Error rate is said to be better than 1 in 10 to the 13th power; mean time between failure is 20,000 hours.

Optotech, Suite 109, 770 Wooten Road, Colorado Springs, Colo. 80915.

ANRITSUI AMERICA, INC.
Booth 2743

Tape drives and subsystems for backing up hard disks will be on display at Anritsu America, Inc.'s exhibit.

Product features include power-on diagnostics, automatic tape loading and threading, Ansi/IBM compatibility, rack mounting and cache memory. The DMT 730 series consists of ¼-in. cartridge tape drives in streaming or start/stop models that retrofit to identical ½-in. drives without modifying existing tape handlers, the vendor said.

The DMT 2500 series includes ½-in. streaming drives that reportedly offer up to 138M bytes of storage at 3.2K bit/in. and 64K bytes of cache memory.

For mainframes, the DMR 3000 series provides ½-in. start/stop drives that accommodate up to 10½-in.reels.

Anritsui America, 128 Bauer Drive, Oakland, N.J. 04736.

CHINON AMERICA, INC.
Booths 1944, 1945

Chinon America, Inc.'s Information Equipment division will showcase matrix line printers and multicolor thermal printers.

The 80-col. Model 101 24-pin dot matrix line printer reportedly offers letter-quality speeds of 25 line/min, with draft-quality speeds measuring 75 line/min. The diameter of each dot is .02mm.

The Model 103 is an 80-col. serial matrix thermal transfer device that can print bidirectionally in up to four colors, the firm said.

Draft mode speed prints 105 char./sec.; near-letter-quality mode prints at 45 char./sec.; and true letter-quality mode runs at 35 char./sec. This printer also uses 24 pins and a dot diameter of .02mm, according to the vendor.

Chinon will also show 5¼-in. and 3½-in. single- and double-sided floppies.

Chinon America, Suite 350, 11340 W. Olympic Blvd., Los Angeles, Calif. 90064.

DENNISON KYBE CORP.
Booth 5363

Dennison Kybe Corp. will showcase the Series 6000 system for maintaining and evaluating computer tapes used on 800-, 1,600- and 6.25K-bit/in. drives.

The tape maintenance system is said to provide dual RS-232C ports for communication with CRTs, printers and computers.

It can also reportedly rewind a 2,400-ft reel of tape in less than two minutes.

Prices range from $9,995 to $16,995, depending on configuration, the vendor said.

Dennison Kybe, P.O. Box 472, 132 Calvary St., Waltham, Mass. 02254.

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NCC Preview

Power systems at NCC

SOLA ELECTRIC CO.
Booths 6077, 6177, 6178, 6179

Sola Electric Co., a unit of General Signal Corp., will display a 1200VA standby power source (SPS), a power line monitor with printer and a 3-kVA uninterruptible power supply (UPS).

The SPS switches from line to battery/inverter power within four to 10 msec when line voltage drops below -15% of nominal, the vendor said. When ac voltage returns to within 10% of nominal, retransfer reportedly occurs within two to four msec.

The power line monitor is said to enable continuous, unattended analysis of power line quality and provide user-adjustable disturbance thresholds plus printouts of date, time and value of disturbances.

The 3-kVA UPS includes on-line battery reserve to supply the load with uninterrupted power automatically.

The 120V, 60Hz SPS costs $1,245; the 220/240V, 50Hz model sells for $1,340. The power monitor is priced at $1,595. Prices for the 3-kVA UPS with one battery pack start at $7,500.

Sola Electric, 1717 Busse Road, Elk Grove Village, Ill. 60007.

INSTRUMENTATION AND CONTROL SYSTEMS, INC.
Booth 6444

Instrumentation and Control Systems, Inc. will present uninterruptible power supplies (UPS) for large systems and microcomputers.

The ICS Electro-Pac Model E UPS reportedly provides stable output, high overload capabilities and a range of alarms. If a total loss of incoming power occurs, the system transfers to the battery backup.

The Lifeline UPS for microcomputers is said to provide voltage regulation and line filtering at all times plus an inverter that supplies power only during power outages.

Prices for the ICS Electro-Pac Model E UPS range from $7,000 to $23,000. The Lifeline UPS runs from $1,040 to $2,300.

Instrumentation and Control Systems, 520 Interstate Road, Addison, Ill. 60101.

IMUNELEC, INC.
Booth 3045

Imunelec, Inc. will exhibit its Star Series 01 uninterruptible power supplies (UPS) that reportedly protect microcomputers against blackouts, brownouts, surges, noise and other power line disturbances.

The UPS units feature an audible alarm, automatic temperature- and battery-protection circuits and a sealed battery.

The 250VA UPS sells for $1,360; the 500VA unit costs $1,595; and the 1,000VA UPS is priced at $2,180.

Imunelec, 517 G Acorn St., Deer Park, N.Y. 11729.

SOLIDSTATE CONTROLS, INC.
Booth 2338

Solidstate Controls, Inc. will exhibit uninterruptible power supplies (UPS) for DP applications.

The Powerbase 1000 UPS series models are said to provide automatic power protection against blackouts, and brownouts, among other things.

It costs $2,500 for the 750VA model, $5,100 for the 1.5-kVA model and $6,200 for the 3-kVA model.

Solidstate Controls, P.O. Box 1216, Columbus, Ohio 43216.

ACRAN, INC.
Booths 4410, 4412

Acran, Inc. will display a relocatable uninterruptible computer power backup system.

Called a Critical Power Module (CPM), the system reportedly includes an insulated enclosure, an uninterruptible power supply (UPS), battery, switch gear and air-conditioning, heat, acid neutralization pits, eyewash, drench shower, dielectric flooring, halon fire suppression and internal and external lighting.

The cost of engineering a UPS installation by a consulting engineer runs is said to be approximately $25,000.

Acran, P.O. Box 18328, Austin, Texas 78760.

TRIAD POWER SYSTEMS
Booth 2514

Triad Power Systems will show its TRI-UPS 300+600 uninterruptible power supply (UPS) for the IBM Personal Computer, Personal Computer XT and compatible micro-based systems.

The TRI-UPS is said to provide uninterruptible power, conditioned power, power distribution, and requires no transfer time when commercial ac power fails. It costs $995.

Triad Power Systems, 10362 Miller Road, Dallas, Texas 75238.

NCC Preview

Other things to see at NCC

MICRO SECURITY SYSTEMS, INC.
Booth 2810

Micro Security Systems, Inc. will present a software security device that runs on IBM Personal Computer and compatible processors.

Called Securikey, the device has a key that is said to interface with the computer's microprocessor. This allows a vendor to place a serial number in his software that the computer compares to the key's serial number.

Securikey costs $100.

Micro Security Systems, 3706 W. 2100 South, Salt Lake City, Utah 84120.

ALPHA AUDIO ACOUSTICS
Booth 5079

Alpha Audio Acoustics will exhibit Soundtex, an acoustical fabric wall treatment said to filter noise in the computerized office.

Soundtex costs $25 a linear yard. A 54-in. by 35-yard piece sells for $729.

Alpha Audio Acoustics, 2049 W. Broad Street, Richmond, Va. 23220.

ADE, INC.
Booths 1942, 1943

ADE, Inc. will display its Caddy-Pack C-D Transporter, a static-free electronic component protection system said to provide EMI/RFI attenuation.

A two-part protective system, the Caddy-Pack C-D consists of a component-holding transporter and a mated shipping sleeve.

ADE, 1560 E. 98th St., Chicago, Ill. 60628.

DATAPRO RESEARCH CORP.
Booth 5053

Datapro Research Corp. will show an information service that is said to help businesses cut down on data loss from computer downtime.

Called "Datapro Reports on Information Security," the two-volume publication contains management reports, evaluations of security hardware and software plus reports on the latest standards, policies and regulations adopted by the U.S. Department of Defense.

Subscriptions cost $455. Presubscription is $395.

Datapro Research, 1221 Avenue of the Americas, New York, N.Y. 10020.

ROYAL SEATING CORP.
Booth 2145

Royal Seating Corp. will display computer accessories including a mobile data rack, printer-paper basket, paper caddy and furniture for the IBM Personal Computer and PCjr.

The Model 0840 adjustable mobile data rack is said to accommodate 9½- by 11-in. or standard 14⅞-in.-wide hanging data binders.

The Model 0890 H&M Gravity Master Universal Basket reportedly allows smooth flow and refold of printed forms for all types of printers and can accommodate up to 25 lb of large standard forms.

The Model 0865 H&M Forms Flow Paper Caddy provides a cantilevered slant of the retrieval basket that forces printed forms to force fold automatically on impact.

The Model 5800 series computer furniture for IBM Personal Computers includes data drawers, data boards and facility compartments.

The 0840 data rack costs $71; the 0890 basket sells for $32.60; the 0865 paper caddy is priced at $68.80; and starting prices for 5800 series furniture start at $346.40.

Royal Seating, P.O. Box 753, Cameron, Texas 76520.

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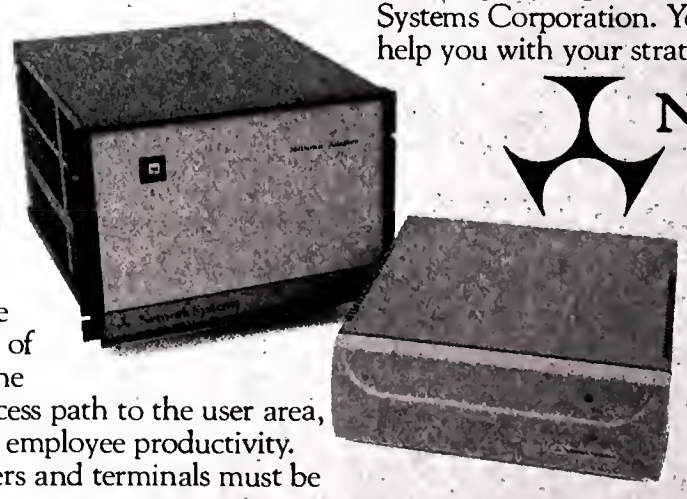

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COMMUNICATIONS

AT&T: Waking up to market but still not awake

DATA STREAM
Paul Korzeniowski
CW Senior Writer

AT&T executives have been reading the newspaper. For almost a year, stories concerning the communications company's haphazard transition from regulated monopoly to nonregulated competitor in the computer field have appeared in numerous publications.

These publicized problems have changed the AT&T brass' thinking, as was evident when the company released products at a press conference held last month. When AT&T first entered the computer field, it boldly talked about taking on IBM. Talk has now shifted to coexistence with IBM and even acknowledgment of the stranglehold that IBM has on many market segments.

IBM's strong grip has left few markets open for AT&T. The communications giant has been forced to recognize that only the regional operating companies were interested in its hardware. It has acknowledged that sales to other market segments have to be made for it to become a major player in the computer market. By year's end, AT&T expects that one-third of its sales will come from other markets. New sales will hopefully be secured from two areas: niche markets and departmental processors.

In its latest product announcement, AT&T emphasized vertical market software and vertical marketing. Marketing does not sell systems. Software does, but there is still very little vertical market software that runs on the 3B line. Also, AT&T had already introduced some packages that it included in its recent announcement.

Another problem stems from the fact that the departmental computing market is quickly becoming saturated. Recent woes at Wang Laboratories, Inc. and Data General Corp. mirror problems many firms are having in this arena.

The communications links to the IBM world AT&T announced will help it compete in this market. However, the communications company is still a few steps behind its chief competitors. Companies such as Digital Equipment Corp., DG and Wang have more extensive gateways into IBM systems than AT&T does. AT&T said it intended to supply links to IBM's Document Content Architecture, Document Interchange Architecture and LU6.2 in the next 12 months. Whether it can deliver on that intention remains to be seen.

Since these firms are a few steps ahead of AT&T, gossip has centered on an AT&T buy-out of one of these companies, specifically Wang. AT&T has denied interest in a deal. In many respects, the deal might not make sense.

See **AT&T** page 46

WIRE TAP/DANIEL MINOLI

The path to good network design

To implement a trouble-free network smoothly, it helps to ask and answer key questions beforehand. Presented here is a set of design factors whose consideration will facilitate network implementation.

These principles can be used whether one is adding a network component such as a centralized diagnostic system, expanding a network into a new geographic area or replacing a network with a new, more sophisticated network.

The word component is used to encompass anything from a modem or multiplexer to a major packet-switched network.

- *Reliability*. What is the reliability of the new component measured in terms of mean time between failures and in mean time to repair? How will this additional component affect networkwide reliability?
- *Availability*. What availability, measured in terms of uptime, can be expected of the new component and its systemwide effect?
- *Restorability*. How easy will it be to restore the network before and after the new addition?
- *Fault tolerancy*. Is the component fault tolerant? Does it compromise existing fault tolerancy?
- *Security*. Is the new component secure under all pertinent measures? How does it mesh with existing security measures?
- *Grade of service*. Is the grade of service of the existing network — in terms of things such as delay, blocking noise and so on — compromised by the new addition? What performance targets are being sought?
- *Operability*. How does the new component fit in with existing operation issues? Must new procedures be instituted?
- *Business risk while in transition*. Does the

See **NET** page 46

Minoli is an associate vice-president, systems planning and engineering, of Prudential-Bache Securities, Inc. in New York.

HP offers SNA analysis software

PALO ALTO, Calif. — Hewlett-Packard Co. has announced IBM Systems Network Architecture (SNA) analysis software for the portable HP 4951A and the high-performance HP 4953 protocol analyzers. The packages are the HP 18186A and the HP 18153A.

The analysis packages are said to eliminate the need to hand-decode the bit-packed fields presented by analyzers equipped with lower level Synchronous Data Link Control (SDLC) formats. Using the SNA analysis software, HP protocol analyzers extract the upper level information field by field from SDLC I frames and display it in SNA terms, the company reported.

The HP 18186A/4951 is a portable SNA testing tool that is said to provide information needed to locate problems, particularly between cluster controllers and the SNA network where FID Type 2 communications are used. The software displays the transmission header, the request/response unit and the function-management header in high-level mnemonics.

Other SNA communications using FID 0, 1, 3, 4 and F transmissions are partially decoded for analysis by the HP 18186A and may be stored for more complete analysis by its sister product, the HP 18153A/4953, the vendor said.

The HP 18153A SNA analysis application for the HP 4953A protocol analyzer allows the user to monitor, capture and analyze data traffic anywhere on the SNA network, including host-to-host communications.

The testing tools can be employed anywhere SNA data flows over an SDLC link that uses any HP physical interfaces, including RS-232C, CCITT V.35 and RS-449.

The HP 18186A is priced at $500, and the HP 18153A is priced at $750.

HP is located at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Data Switch offers matrix switch

Product allows isolation of faulty components

NORWALK, Conn. — Data Switch Corp. has announced the Model 2810 integrated digital matrix switching and analog access and sparing system, said to allow isolation of faulty components and lines.

The product reportedly can operate as a standalone switch for small central sites or can be located at a remote site in conjunction with the company's XY-Max Model 2840 switch. According to a spokesman, the Model 2810 handles any combination of up to 64 RS-232/CCITT V.24 lines, up to 14 CCITT V.35 lines and up to 64 two- or four-wire telephone lines.

Analog upgrades of up to 128 lines are available.

The Model 2810 is controlled either by a local CRT terminal or through Data Switch's Configuration Management System (CMS) control console, the vendor said.

As many as 16 Model 2810s located anywhere in a network can be centrally controlled through CMS, the company reported. CMS stores up to 1,000 network configurations predetermined by the user.

CMS is also said to enable time- and event-sensitive switching.

Time-sensitive switching allows users to instruct the switch to reconfigure equipment and line interconnections automatically at a certain time and date and to smooth traffic loads at peak hours. Event-sensitive switching causes the switch to reconfigure when it senses a failed line or component, the vendor said.

The Model 2810 also support IBM diagnostic modems.

Data Switch said that the basic price for a Model 2810 that supports 64 digital lines and 64 analog lines is $49,100. The digital-only model costs $24,300, and the analog-only model that supports 64 telephone lines costs $28,900. The product is scheduled for August availability, according to the vendor.

For additional information, Data Switch is located at 444 Westport Ave., Norwalk, Conn. 06851.

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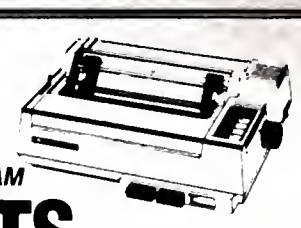

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WESTWOOD COMPUTER CORPORATION

COMMUNICATIONS

NET from page 45

transition put the company at risk? How long is the transition? For a modem, it could involve a few hours of downtime; for a new network, it could take months or years to implement. Is there a good transition plan?

■ *Business risk.* Is the new component likely to be a risk because it uses totally new technology, existing technology but new products or a new company?

■ *Network control.* Is the new component amenable to rational network control? Does it add to or detract from network control?

■ *Cost-effectiveness.* Is the new component cost-effective? Have several vendors been contacted? Is there a more cost-effective way to approach the problem?

■ *Stability.* What is the technological stability of the product? Does the component affect the viability of the existing network?

■ *Interoperability.* How well does the new product integrate with the existing network at the technical, management and vendor level? Does it create compatibility problems?

■ *Growth.* How does the new component affect the growth capability of the system? Does the new product peak out at some level — ports, memory, addresses, throughout — beyond which it is not possible to expand?

■ *Capitalization.* What is the cost of the component? Should one lease or buy?

■ *Vendor purity.* Does the new component imply an increase in the total number of vendors that serve the communications network? Does the component have to be embedded within the domain of another vendor's equipment?

■ *Accountability.* Are the accountability issues, such as cost assignment, management and maintenance responsibilities and security, clearly defined for the new component?

■ *Measurability and reporting.* Can the added component be measured by way of various norms to ensure things such as proper grade of service or response time? Are MIS reports available, where applicable, for the new component?

■ *Competitive edge.* Given the additional effort and cost to install the new component, does it now make the network better? Does it give the organization a business edge over its competitors?

AT&T from page 45

AT&T has a product line comparable to Wang's line. Why purchase Wang's VS line when the 3B line is already positioned against it? Integrating the two lines would be a difficult task.

Perhaps AT&T should be more interested in Sperry Corp. AT&T has expanded its product line from microcomputers to superminis. Yet, a glaring hole exists at its high end where IBM reigns supreme. Analysts have predicted that Amdahl Corp. products will fill that hole. The two companies have a close relationship. A closer relationship would make economic sense.

A year ago, a wide-eyed AT&T entered a new market. A disappointing year has changed the company. It now understands the challenges it faces. For better or worse, IBM owns great chunks of the computer market.

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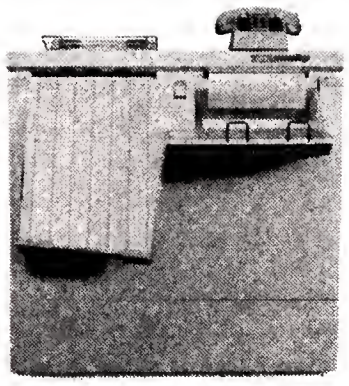

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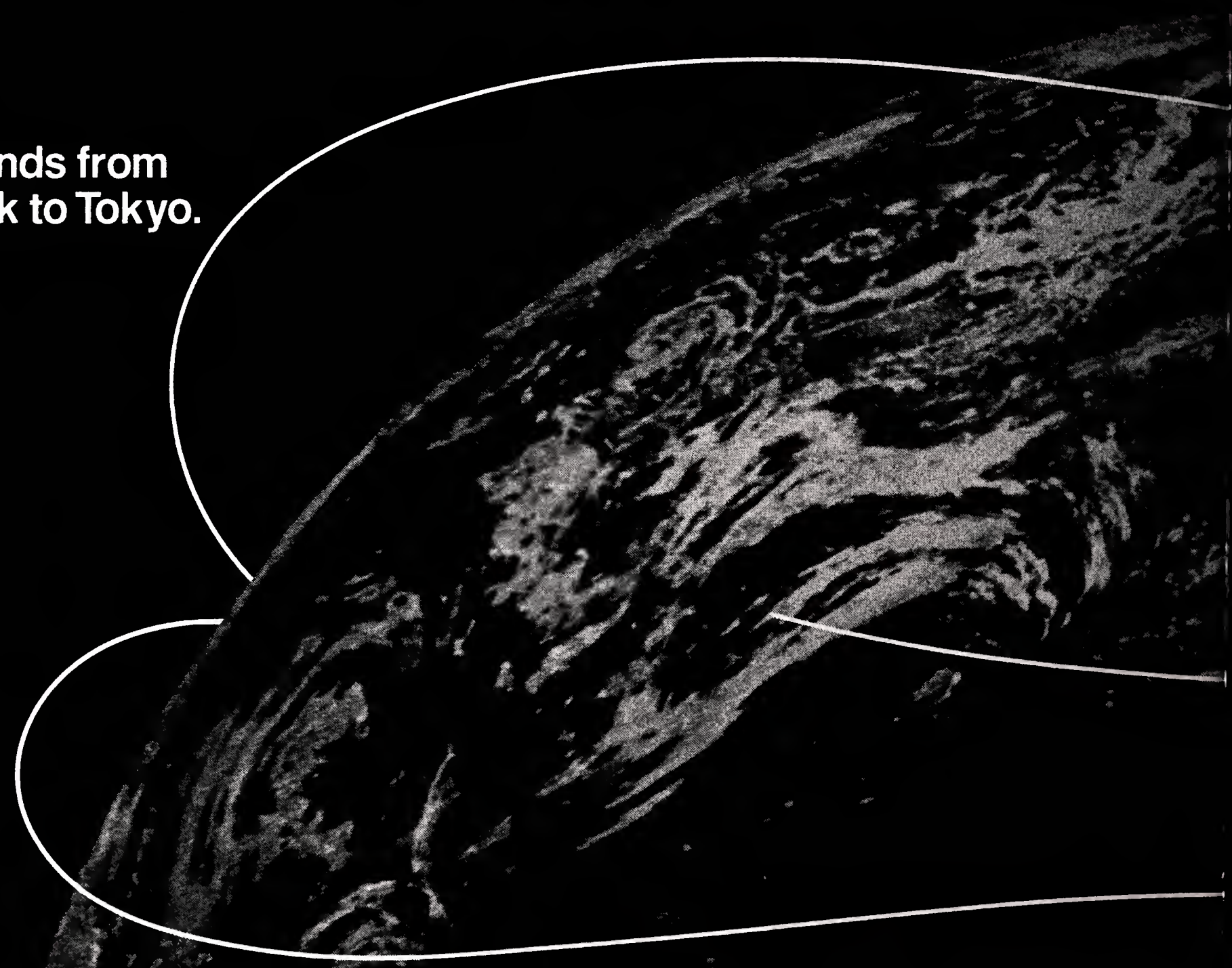

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XEROX

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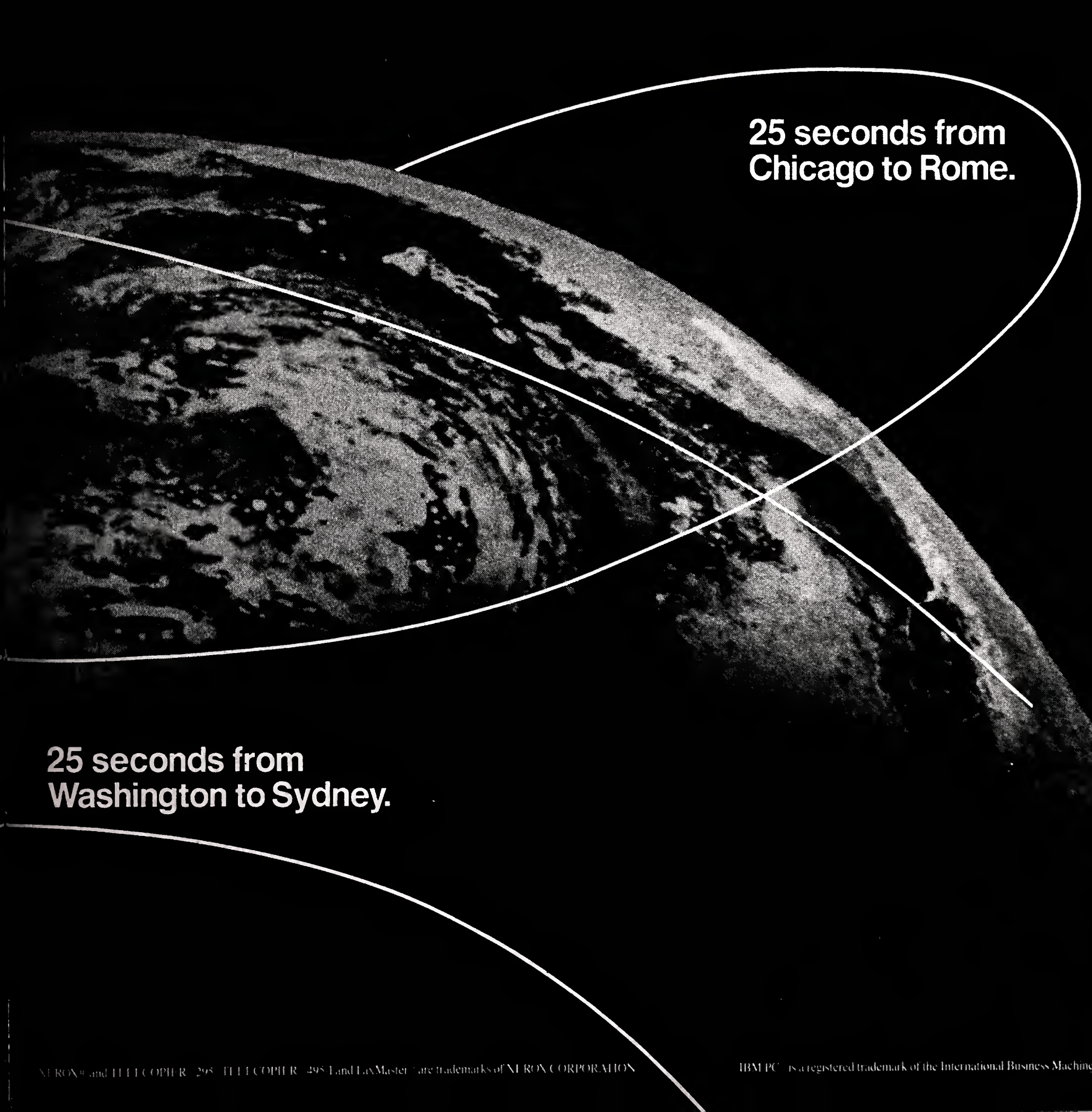

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SYSTEMS & PERIPHERALS

Cray slices $1 million off solid-state storage tag

By Donna Raimondi
CW Staff

MINNEAPOLIS — Cray Research, Inc. has slashed $1 million off the price of its top-of-the-line Solid-State Storage Device (SSD) and unveiled a $3 million model of the SSD.

In addition to announcing the middle-of-the-line SSD, which is said to offer 512M bytes of random-access memory, the company also increased the performance and dropped the prices of two other models in the SSD product line.

The SSD products are high-speed storage devices designed to complement the Cray X-MP supercomputer's multiprocessor architecture, a spokesman said. The devices can be used for temporary storage of system programs.

The SSD units are said to be field upgradable from the smallest to the largest sizes. The newly announced version is software compatible with earlier models, the company said.

The top-of-the-line 1.024G-byte model introduced in 1984 and originally priced at $5 million has been reduced to $4 million. A 256M-byte model introduced in 1982 and previously priced at $3.28 million is now available for $2 million, a spokesman said.

Improvements and price cuts on the SSD line are primarily a result of the incorporation of higher density MOS technology, a spokesman said. The primary enhancement is an increase in the memory bandwidth. The SSD's maximum burst transfer rate is now 27G bit/sec.

More information is available from Cray Research, 608 Second Ave. S., Minneapolis, Minn. 55402.

DG minis get controllers

MOUNTAIN VIEW, Calif. — Spectra Logic Corp. has released disk and tape controllers for Data General Corp.'s Eclipse and Nova minicomputer systems. The four controllers are said to allow the integration of any storage module drive (SMD)-compatible device.

The controllers support 2.5M byte/sec. data transfer rates. Standard emulation of more than 150 different DG disk drive subsystem configurations is said to be supported. Optional software support is included for DG's AOS and AOS/VS operating systems for those exceptions when a disk drive cannot be mapped for maximum capacity.

Because of the emulation capability of the controllers, disk drives such as those offered by Ampex Corp.; Control Data Corp.; Fujitsu America, Inc.; Century Data Systems, Inc.; and NEC Information Systems, Inc. can be configured to use the maximum formatted disk capacity possible, while operating at the 2.5M byte/sec. transfer rates, the vendor said.

The 27-Plus, which interfaces with the burst multiplexer channel or the data channel, costs $5,300. The 120-Plus, which connects to the data channel, costs $4,500. The 17-Plus interfaces with the burst multiplexer channel and is also priced at $4,500, and the 210-Plus for the data channel bus costs $3,700.

More information can be obtained from Spectra Logic, 297 N. Bernardo Ave., Mountain View, Calif. 94043.

Xerox offers automated mail system

PASADENA, Calif. — Xerox Corp. has announced a model of its Xerox Message Processor system that can print, collate and distribute narrative messages automatically with or without operator intervention. The system is for use in large telecommunications centers handling time-sensitive messages. It interfaces with Data General Corp. Eclipse minicomputers, the vendor said.

The Xerox Message Processor 500 (XMP 500) is said to be based on the company's 10 series copier/duplicators. The system is the first 10 series system to use a laser printer, the vendor said. The unit has an average printing rate of 70 page/min and features optional two-sided printing and automated stapling. It reportedly can deliver messages to as many as 300 different message addresses. Additional printers and sorters can be included as message processing requirements grow.

The XMP 500 prioritizes incoming messages for printing and prints those with higher precedence first, the vendor said. Once printed, messages are automatically deposited into their respective message bins.

The unit includes the central communications processing controller, a Winchester disk storage subsystem, electronic laser printers for message output, sorter bins for message routing and a communications interface.

Depending upon the mainframe computer used in the telecommunications center and the system configuration ordered, an average XMP 500 will cost from $650,000 to $750,000, and deliveries will begin in the third quarter of 1985.

More information is available from Xerox, Xerox Centre, 101 Continental Blvd., El Segundo, Calif. 90245.

■ DEC announced ruggedized versions of its microcomputers and terminals/**52**

■ Lundy Electronics unveiled three graphics workstations/**52**

■ Chromatics introduced a color graphics display for use with DEC VAX series superminicomputers/**54**

■ EMC is offering 4M- and 8M-byte memory cards for DEC VAX-11/785 CPUs/**54**

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AT&T marketing strategy: A failure to communicate?

HARD TALK
Tom Henkel
CW Senior Editor

For a company that many speculate has the strongest chance of giving IBM a run for its money in the computer business, AT&T seems to be a slow learner when it comes to meeting IBM on its strongest turf, the marketing game.

AT&T has just bungled another product announcement with an overhelping of confusion and uninformed company representatives. As with previous announcements, it is still difficult to get information out of AT&T because the people appointed to answer questions about new products don't seem to understand them fully. Many basic questions have to be relayed to a hierarchy of people within AT&T.

AT&T's inability to pull off a press conference is, by no means, a fatal flaw. But it does seem to be part of an underlying issue: On the surface, AT&T says it is ready to do business in the highly competitive systems marketplace, but there seem to be remnants of the sluggish, bureaucratic and monopolistic Ma Bell that appear to be hampering AT&T's effectiveness in a very intense business.

The company's June 24 announcement of more than 30 products stood in stark contrast to a similarly large announcement by IBM a week earlier [CW, June 24]. IBM made its announcement armed with an impressive package of product literature that, if one took the time to read through 237 pages of specifications, completely described what IBM had announced.

AT&T released a mishmash of specifications, many of which had no apparent relevance to the announced products. Furthermore, much of the information that AT&T released was incomplete.

Models were mentioned, but no attempt was made to indicate what was included with those models or how they differed. AT&T said it improved the performance on its 3B5 product line but could not explain how it accomplished this feat or by how much performance was increased. It said prices on the 3B2/300 were cut by 20% but could not say what the old prices were. The list goes on.

AT&T was clearly unprepared for its latest announcement. In a marketplace where a company's success is becoming increasingly dependent on its sales and marketing prowess, AT&T seems to send its new products off on the wrong foot.

It has been a little more than a year since AT&T formally jumped into the commercial systems marketplace. While the firm seems to have done all right in selling other products to end users, it has made little headway in competing with entrenched vendors in the systems marketplace. For example, it has sold a handful of its high-end 3B20 machines to a tiny group of users and has only had marginal success in selling its smaller systems.

The unfortunate thing is AT&T may actually have some decent products to sell. But who knows? The company does not seem able to explain its current product lineup adequately, nor does it appear to have the foggiest idea of where it is going in the future. What is worse, the firm seems arrogantly unwilling to make changes to its current marketing approach.

AT&T will never be able to match the master of marketing, IBM, as long as it continues with its current haphazard techniques. There are too many good products and good marketing and sales people in the business today for AT&T simply to sit back and wait for users to line up at its door begging for information about the AT&T product line.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

■ **Vector Automation has announced an addition to its Cadmax family of computer-aided design and manufacturing systems.**

The Cadmax-IIB includes dual microprocessors with 1M byte of memory each, a 31M-byte disk drive and a 2.5M-byte floppy disk subsystem. The system features a 4096- by 4096-pixel resolution display and two-dimensional design and drafting software.

The Cadmax-IIB costs $46,000.

Vector Automation, Village of Cross Keys, Baltimore, Md. 21210.

PRINTERS/PLOTTERS

■ **General Business Technology has announced two line printers for the IBM System/34, 36 and 38 processors.**

The printers are said to feature operator-changeable bands of 48-, 64- and 96-character sets. The 3310LP prints at 450 line/min using the 48-character band set, 375 line/min using the 64-character set and 280 line/min using the 96-character band set. The 3320LP doubles the print speed of the 3310.

The 3310LP printer costs $8,800, and the 3320LP costs $12,500.

General Business Technology, 1891 McGraw Ave., Irvine, Calif. 92714.

■ **Interface Systems, Inc. has released an IBM 3270-compatible printer that is said to support IBM programmed symbols and APL/Text and connect to an IBM Personal Computer.**

The ISI 468 can print seven colors and also provide compatibility with the IBM 3287 and 3287-2C four-color printers. It can be directly plugged into any IBM 3274 control unit, 3276 control unit display station or 4300 CPU, the vendor said. Users are not required to have color software or color displays to print in color; through data input procedures, users of monochrome displays can print with ISI 468's color character printing.

The standard 468 costs $4,950, and a 468 II model, which corresponds to the IBM 3268-2C and 3287-2C, costs $6,450.

Interface Systems, 5855 Interface Drive, Ann Arbor, Mich. 48103.

■ **Infoscribe, Inc. has released its Model 800 professional demand document printer for printing multipart, preprinted forms on microcomputers.**

The dot matrix Model 800 prints to within 1/20th of the tear-off bar, which is said to allow immediate tear-off of the document so the next one can be printed on. It prints at 200 char./sec. for draft quality, 100 char./sec. for correspondence and 40 char./sec. for near-letter quality and has graphics printing resolution of either 72 by 72 dot/in. or 144 by 144 dot/in. The model is said to print six-part carbon or carbonless paper forms, and it comes with either a serial or parallel port.

The unit costs $1,895 with discounts for volume purchases.

Infoscribe, 1808 Michael Faraday Court, Reston, Va. 22090.

GRAPHICS SYSTEMS

■ **Infodetics has announced a graphics workstation for use with its Computer-Assisted Document Management and Control system.**

The full graphics workstation features 512K bytes of memory; a 16-bit processor; scroll, pan, highlighting and zoom functions; and the ability to rotate three-dimensional models. An optional drawing change capability allows authorized users to make changes to display images, the vendor said.

The basic system includes the processor and 512K bytes of memory, an I/O controller and a 35.6M-byte Winchester disk drive. A 1M-byte floppy disk drive is optional.

Prices range from $44,000 to $59,000, depending upon configuration.

Infodetics, Suite 200, 1360 S. Anaheim Blvd., Anaheim, Calif. 92805.

■ **Disc Instruments, a Honeywell, Inc. subsidiary, has announced its Dial Set multimodality manual graphics input device that allows users of large computer-aided design and manufacturing equipment with serial ports to vary all perimeters of a three-dimensional graphics drawing.**

The device contains a digitized microprocessor-controlled terminal that can be used in conjunction with Disc's Series T500 three-axis trackball device, which provides systems with an X, Y and user-definable third axis for the rotation of 3-D figures as well as for zoom.

The Dial Set capability is available in blocks of four, eight, 12 and 16 dials. It uses either an RS-232C or standard transistor-transistor logic serial connection and has a transmission speed of 9.6K bit/sec. or an optional speed of 4.8K bit/sec.

The basic system — consisting of a microprocessor, an output interface, four dials and 250 lines of firmware code — costs $450 each in quantities of 100. Extra dial module sets cost $110/pair (two dials), in quantities of 100.

Disc Instruments, 102 E. Baker St., Costa Mesa, Calif. 92626.

■ **Lundy Electronics & Systems, Inc. has announced a trio of graphics products, including a three-dimensional raster graphics workstation, a stand-alone graphics workstation and a Tektronix, Inc. 4027-type graphics terminal.**

The Ultragraf III 3-D raster graphics workstation is said to feature local intelligence for rotation, scaling, translation and perspective functions. It displays up to 256 colors from a palette of 16.7 million colors and is said to permit multiwindow operation with single-pixel addressability. The workstation connects to Digital Equipment Corp.'s VAX-11 series machines, Prime Computer, Inc.'s 2250 minicomputer and Control Data Corp.'s Cyber 1810 computer.

The Lundy 2000 is a stand-alone

Continued on page 54

DEC micros ruggedized

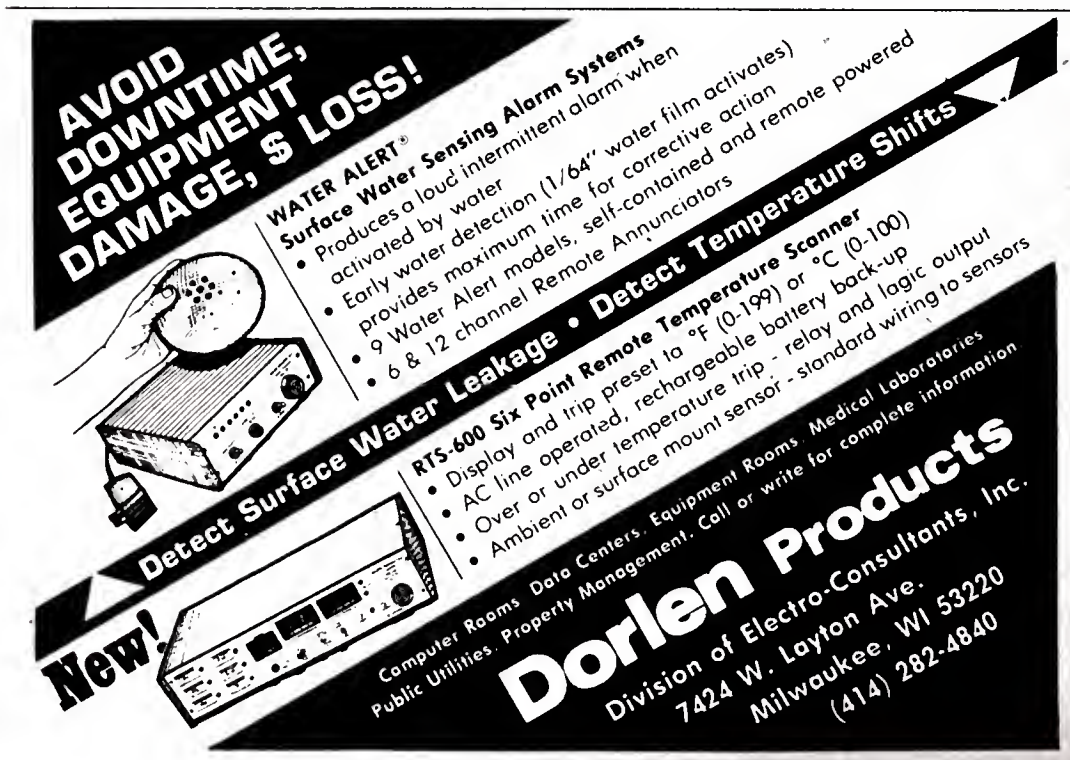
MAYNARD, Mass. — Digital Equipment Corp. introduced ruggedized versions of its microcomputer systems and terminals for use in industrial environments. The RT950 series includes factory-hardened versions of the MicroPDP-11, MicroPDP-11/73 and Microvax II computers in protected enclosures.

The companion RT200 video terminals are DEC's VT200 series terminals packaged inside air-vented enclosures.

The entry-level MicroPDP-11/23 system features 512K bytes of memory without storage peripherals and costs $9,975. Another MicroPDP-11/23 system includes the same memory and an 11M-byte hard disk and a dual 400K-byte floppy drive. It costs $14,250. A MicroPDP-11/73 model with 512K bytes of memory, a 31M-byte hard disk and dual 400K-byte floppy disk drive costs $18,250. The Microvax II-based system features 1M byte of memory, a 31M-byte hard disk and a dual 400K-byte floppy drive. It costs $19,975.

The terminals include the RT220 monochrome text terminal with a 12-in. screen that costs $2,995, the RT240 12-in. monochromatic terminal for $4,995 and the RT241 13-in. color termimal that costs $5,995.

DEC is located in Maynard, Mass. 01754.



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SYSTEMS & PERIPHERALS

Continued from page 52

graphics workstation that runs under either or both Microsoft Corp.'s MS-DOS or Digital Research, Inc.'s CP/M operating systems. The system is said to emulate Tektronix, Inc.'s 4010 terminal so that the user can add color.

The GTC-327 graphics terminal is said to provide the capabilities of the Tektronix 4027 terminal. It is said to display 640- by 480-pixel resolution and eight simultaneous colors on a 14-in. monitor.

The Ultragraf III costs $45,995. The Lundy 2000 is priced at $21,900, and the GTC-327 costs $4,200.

Lundy Electronics & Systems, One Robert Lane, Glen Head, N.Y. 11545.

■ **Chromatics, Inc. has released a color graphics display system that supports Digital Equipment Corp. VAX machines under DEC's VMS operating systems and Sun Microsystems, Inc. workstations under AT&T's Unix.**

The CX 1536 Colorgraphic Display System was designed for command, control, communications and intelligence; artificial intelligence; simulation; and computer-aided design, manufacturing and engineering applications, the vendor said.

The system employs a two- and three-dimensional display list architecture.

The system has a 1,536- by 1,152-pixel, 60Hz noninterlaced color monitor and is programmed through a graphics kernel system package.

The basic system, which includes four single-buffered image planes, 512K bytes of display list memory, CX 1536-resident firmware including the GKS emulator and a DEC VT100 terminal emulator, costs $34,995.

Chromatics, 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

POWER SUPPLIES

■ **Dynatech Computer Power, Inc. has released a version of its Powerhouse uninterruptible power supply that will accommodate up to 300W of power and is said to provide protection for business and industrial applications such as microcomputers, computer peripherals and video products.**

The Powerhouse 300 provides surge and outage protection and has a typical transfer rate of 1 to 4 msecs, transient-free switching and five to 15 minutes of uninterrupted power, the vendor said.

The Powerhouse 300 costs $595.

Dynatech Computer Power, 4865 Scotts Valley Drive, Scotts Valley, Calif. 95066.

■ **Elpac Power Systems has released its EDS200-1 switching power supply for hard disk-based systems and peripheral memory storage devices that would be connected to a mini-based system.**

The EDS200-1 is a four-output supply with a main output of 5V, 15A with a 20A peak. The unit has second and third outputs of 12V to 15V with 2A of current on both outputs.

The fourth output is 24V, 2A with a 4A peak, the vendor said. The unit is said to have a minimum holdup time of 40 msec at nominal input voltage and maximum output power.

The units cost $157 apiece in OEM quantities, the vendor said.

Elpac Power Systems, 3131 S. Standard Ave., Santa Ana, Calif. 92705.

■ **NJE Corp. has added a dc-to-dc single-output switch mode model to its MK power supply series that provides output from 500W to 1,500W.**

The MK Series DC Input was designed for telecommunications applications where equipment is operating off of 48V station batteries and in equipment requiring battery-backup circuitry. Input levels can range from 42V to 56V dc and the output is isolated from the input.

The dc-to-dc switcher meets the Federal Communications Commission's Electromagnetic Interference/Radio Frequency Interference requirements. Features include overvoltage, overcurrent and thermal protection, remote sensing, inhibit capability, short-circuit protection and soft start.

The dc-to-dc switcher costs $1,050 in quantities of 100.

NJE, P.O. Box 669, 329 Culver Road, Dayton, N.J. 08810.

BOARD-LEVEL DEVICES

■ **EMC Corp. has introduced 4M-byte and 8M-byte memory cards that are reportedly compatible with Digital Equipment Corp.'s VAX-11/780 and VAX-11/785 computer systems.**

The EMC VX-4MB-780 and the EMC VX-8MB-780 use 256K-bit chips and can be used in any VAX machine that accepts either DEC's MS780-E or EMC's 780 memory system.

Using the 4M-byte arrays, the 11/780 can be configured with up to 64M bytes of memory, the vendor said.

The VX-4MB-780 costs $9,100; the VX-8MB-780 costs $16,000.

The company also announced that it will give 100% credit for owners of EMC's 1M-byte and 2M-byte arrays, the vendor said.

EMC, 12 Mercer Road, Natick, Mass. 01760.

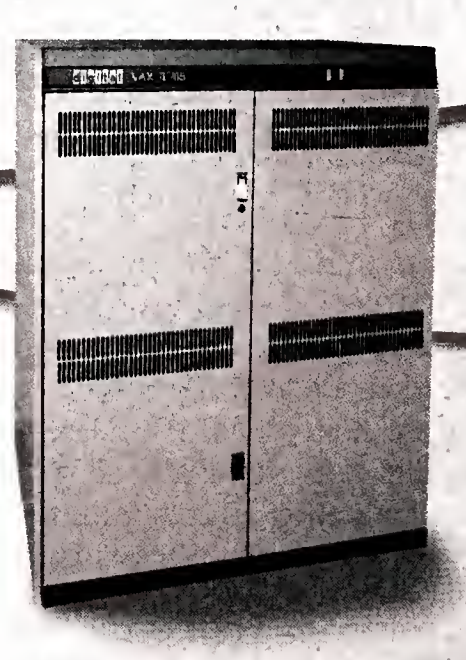
AUXILIARY EQUIPMENT

■ **Atlantic Research Corp. has announced several new features for its Interview 40B Data Analyzer for testing circuits.**

Additional features include func-

You'd think someone would finally straighten out the Ethernet interoperability tangle.

Someone has.



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SYSTEMS & PERIPHERALS

tions for automatic callback; automatic configuration of the tester and data display; unattended remote control, data reanalysis; up to 16 states in one test; eight triggers, which perform 120 separate diagnostic events; a terminal mode to allow it to act as an asynchronous terminal for field applications; four counters; and a 32K-byte CRT data buffer.

The unit costs $4,200.

Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22312.

■ **Nicolet Instrument Corp.'s Digital Test Division has announced an Intel Corp. 8088 emulator, a logic analyzer and a digital test station.**

The Nice 8088 emulator was designed to be used for system development, troubleshooting, debugging or testing. The emulator measures 3½-by 5½-in., is 1-in. thick and features hardware breakpoints, overlay random-access memory, Intel and Tektronix, Inc. Hex upload and download function, program histographs and is to be run in maximum mode only, the vendor said.

Target system interface is via a 40-pin cable assembly or a 40-pin adaptor plug. The unit can be plugged directly into a target system's processor board. An RS-232-compatible interface allows the emulator to talk to most terminals and modems, the vendor said. It costs $1,250.

The company also released an OEM 50-MHz, 16-channel also, 1,000-word analyzer called the NPC 400 for $3,995. It features parallel, serial and General-Purpose Interface Bus monitor recording, a menu system, timing and state displays, trigger functions and recording speeds up to 11.92K bit/sec.

The DTS 5000 Digital Test Station is modularly expandable and features plug-in subinstruments for state, timing, waveform, time tag, emulation and pattern generation. It features software for the development of digital microprocessor-based electronic instruments. Depending upon configuration, the test station is priced from $20,000 to $45,000.

Nicolet Instrument, Digital Test Division, 201 Fourier Ave., Fremont, Calif. 94539.

■ **Eventide, Inc. has announced the Eventide intelligent buffer/spooler for use with Hewlett-Packard Co.'s desktop computers. The product is said to allow simultaneous operation of a plotter and printer on an IEEE-488 standard interface bus without tying up the host processor.**

The Expressway is said to route data intended for different peripherals automatically so that more than one peripheral, such as a printer and a plotter, can operate simultaneously. The Expressway uses a Motorola, Inc. 6809 8-bit internal and 8-bit external microprocessor.

The Expressway accepts data at speeds of up to 20K byte/sec. The product has three ports and either 256K bytes or 1M byte of main memory.

The Eventide Expressway is priced at $1,395 for the 256K-byte version and $2,495 for the 1M-byte version. The product is scheduled for June availability.

Eventide, One Alsan Way, Little Ferry, N.J. 07643.

■ **Datacopy Corp. has announced a version of its Series 600 Electronic Digitizing Cameras that capture photographs for electronic publications and drawings for computer-aided design.**

The Model 620 and the Model 620F, which features a built-in focus and framing aid, have a maximum resolution of 3,456 by 4,472 pixels by 8-bit picture elements, the vendor said.

The Model 620 costs $11,950, and the 620F costs $13,950. The units are available with copy stand, lighting system, power supply, personal computer interface software and Datacopy's Word Image Processing System software for $14,950 and $16,950 respectively.

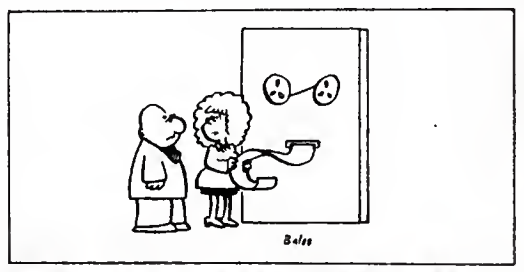
Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

Apollo unwraps dual-density tape drive

CHELMSFORD, Mass. — Apollo Computer, Inc. has introduced a dual-density tape drive, the Model MSD6250, for use with the company's Domain local-area network-based workstations and server processors.

The MSD6250 can read or record data at 6,250 byte/in. in a group code recording format and 1,600 byte/in. in a phase-encoded format.

The tape drive can be used as a shared resource in a Domain local-area network and can be used with Apollo's DSP80 and DSP80A server processors, the monochromatic DN460 workstation and the color DN660 workstations. Available immediately, the MSD6250 costs $26,000 with a monthly maintenance fee of $175. The vendor is located at 330 Billerica Road, Chelmsford, Mass. 01824.



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COMPUTER INDUSTRY

Retail contacts key to firm's success

By Edward Warner
CW Staff

DALLAS — The days of the ever-changing organizational chart, known by employees as the "chart du jour," are over for the market research firm Future Computing, Inc. Gone too are the offices in a suburban shopping mall, to which the firm had moved after it outgrew its founder's spare bedroom.

Today, five years after its founding, Future Computing occupies the entire top floor of a Dallas office building. In the view of Future Computing's chairman, Egil Juliussen, such success is not so startling; the firm's founder, he said, had the forethought to focus the firm's efforts on only one growing area — personal computing — and to leverage her contacts within personal computer retailing to gain data on their sales. The firm's founder and president is his wife, Portia Isaacson.

Future Computing's success is largely due to a good relationship with the personal computer retailer, Juliussen said. Retailers, he explained, "had a warm spot in their hearts" for Isaacson, an early personal computer retailer herself who had provided other neophyte dealers with much advice. Many of Isaacson's contacts, he noted, later became respondents in the twice-a-year Future Computing survey of retail stores, a survey now done monthly.

Retailers had a good reason to fill out the questionnaire, besides liking Isaacson: In return for completing the form, they received a copy of the results and learned for themselves what products were selling best nationwide. More important, because the stores were independents, the manufacturers were at last presented with a way of learning their retail sales figures — and those of competitors.

While Future Computing claims to be the first to do regular surveys of retail stores, it no longer has personal computer market research all to itself. Such firms as Infocorp, Cupertino, Calif.; Dataquest, Inc., San Jose, Calif.; and the Newton-Evans Research Co., Ellicott City, Md., all now cover aspects of personal computing.

When it makes its sales pitch to potential clients, Juliussen said Future Computing can point to a string of accurate predictions going back to its announcement of the impending demise of the first personal computer, the Mits Altair. Other occasions when the firm was on target include its prediction of bright futures for both the Apple Computer, Inc. Macintosh and the IBM Personal Computer, shortly after the birth of the two machines.

Juliussen wrote Future Computing's first report on the personal computer, titled "Billion Dollar Babies," shortly after he joined the firm in June 1981. He still

See **FUTURE** page 65

Downturn's effects stretch coast to coast

Ex-Wang workers consider options

By Clinton Wilder
CW Staff

CHELMSFORD, Mass. — A brief three months ago, the idea of attending a job fair was unthinkable to Clara Currier. The 38-year-old programmer in the corporate MIS department at Wang Laboratories, Inc. had been with the formerly fast-growing office automation company for almost five years and had envisioned a lifelong career there.

"Until March, I would tell people I worked for the most prosperous, most secure computer company around," Currier said. "I thought I'd be there until I was 70, when I would retire to the Wang old-age home, which I figured they would probably have by then."

Instead, Currier was spending a rainy Friday morning looking for a new job at

See **HUNT** page 63

Beating layoffs a matter of skills

By Kathleen Burton
CW West Coast Bureau

Systems and field engineers and other highly skilled workers who have been dismissed in the current computer industry slump are most likely to find new employment quickly, according to placement specialists and industry executives.

"Unskilled manufacturing laborers and white-collar workers in sales have the most difficult time after a layoff," said Michael Eisenscher, a labor consultant in San Jose, Calif. The most easily rehired are secretaries, who can go to a broad diversity of firms, and systems and field engineers, whose services can transfer as the industry's needs shift, Eisenscher said.

"If you are an engineer or a technician, you can walk out the door of a company

See **REHIRE** page 64

Hardware surplus blamed for slump

By Kathleen Burton
CW West Coast Bureau

MENLO PARK, Calif. — At an analysts meeting earlier this year, an Intel Corp. vice-president summarized the semiconductor market with a slide. On it were written two words: "Business stinks."

It was an apt summary of the condition of the Silicon Valley today. Only a year ago, this Northern California complex of semiconductor, microcomputer and other electronics companies was regarded as a showpiece of the American economy.

But in the past year the downturn has been sudden and dramatic. Scarcely a week goes by without once high-flying firms announcing staff cuts, cost cutbacks, plant shutdowns or poor financial results. Intel has implemented two rounds of lay-

See **DOWN** page 67

Industry recession in line with author's dismal 'law'

INDUSTRY INSIGHT
Clinton Wilder
CW Staff

Rule No. 1: It never rains bad news; it pours.

Thus begins the list of McClellan's Laws at the end of former Salomon Brothers Vice-President Stephen McClellan's 1984 book, *The Coming Computer Industry Shakeout.*

At no time have events followed the rule more closely than in the last few turbulent weeks, with Wang Laboratories, Inc., Apple Computer, Inc. and Data General Corp. biting down hard on the proverbial bullet with massive layoffs, shutdowns and other assorted loss cutters. Meanwhile, successive Mondays have found *The New York Times* and *Business Week* blasting the same front page message from the computer industry to the world: slump.

The explanation of McClellan's primary precept goes on to say, in effect, that things will get worse before they get worse. "When you first hear bad news about a company, always expect more of the same to follow. What you first heard is usually only the tip of the iceberg," McClellan wrote.

That logic has held true with Wang, where a simple mandatory July vacation grew quickly into 1,600 layoffs, and with Apple, where another production shutdown was followed in short order by 1,200 pink slips and cofounder Steve Jobs' swift kick upstairs to the guru's office.

The pattern does not bode well for the employees of Hewlett-Packard Co., enjoying their enforced vacations this month.

Nor does it foreshadow good news for the folks at Digital Equipment Corp., where attrition shrinkage and frosted discretionary spending have been in effect, and word has it that the company is pointing out that its record of no layoffs is a tradition, not a policy.

IBM, too, seems to be itchy. After President John Akers' June announcement that Big Blue is depending on a strong fourth quarter to post any growth at all this year, the company appeared to try and kick-start its own recovery (independent of the industry's) with the recent spate of price cuts and new products like the System/36 PC.

In short, the overused term "downturn" is no longer a strong enough word to describe what is going on. This industry is in a recession, and when it recovers, which it will, it is not going to look the same.

The list of industry casualties will continue to grow. As Prime Computer, Inc. Chief Executive Officer Joe Henson pointed out to reporters in a recent informal session, when the top four floppy

See **SLUMP** page 64

■ The U.S. House and Senate finally got around to agreeing on a new Export and Administration Act, replacing the 1979 act that expired almost two years ago/**58**

■ A recent Supreme Court libel ruling places a heavy burden on providers of electronic data base services, according to legal experts/**60**

■ An Idaho-based semiconductor manufacturer spurned diplomatic efforts being waged by the rest of the industry and filed a formal petition asking the U.S. government to impose 'antidumping' penalties on Japanese vendors/**62**

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Congress OKs revised export act

WASHINGTON, D.C. — The U.S. House and Senate recently passed and sent to President Reagan a revised Export Control Act that the president is expected to sign.

The 1979 version of the law expired two years ago but was kept in force by presidential declaration while a vigorous debate raged among advocates of stricter enforcement of high-technology exports to prevent the diversion of exports to Soviet bloc countries.

The revised export bill sets new standards to determine the availability of products overseas, so U.S. firms can export more easily. U.S. industry has mounted a campaign to loosen restrictions on export licensing, which it charged took too long and resulted in lost sales.

President Reagan has given the Department of Defense the power to review license applications, and the new law adopts the regulations spelling out the coordination of export license review that currently exist between the Department of Commerce and the Defense Department.

License categories

New license categories are created by the export bill. Validated licenses for multiple exports are created, of which there are two types. There is a distribution license that permits multiple exports to non-Soviet bloc countries and is based on a Department of Commerce review of the destination and the intended user or receiver of the products. Defense will slowly be able to review this category.

The other is a comprehensive operations license, which permits multiple exports of high-tech goods by firms to their subsidiaries and other business partners that have "defined relations" with the exporter. Internal company controls will be examined by the Commerce Department to ensure that diversions to Soviet bloc countries are thwarted.

The bill would establish an Undersecretary of Export Administration and Office of Foreign Availability in the Commerce Department, increase penalties for illegal exports or transfers of restricted technology and spell out the working relationship between the Commerce Department and the U.S. Customs Service, which is legally charged with enforcing the laws dealing with export/import.

Miniscribe's CEO resigns

LONGMONT, Colo. — Miniscribe Corp. recently announced that Roger Gower, president and chief executive officer of the firm since last November, has resigned.

Gower's responsibilities will be assumed temporarily by an office of the chief executive, consisting of Q. T. Wiles, chairman of the board of both Miniscribe and the investment firm of Hambrecht & Quist, and other executives of Hambrecht & Quist.

The San Francisco-based investment firm headed by Wiles was the lead investor in a venture capital group that provided Miniscribe with $20 million in financing this past April.

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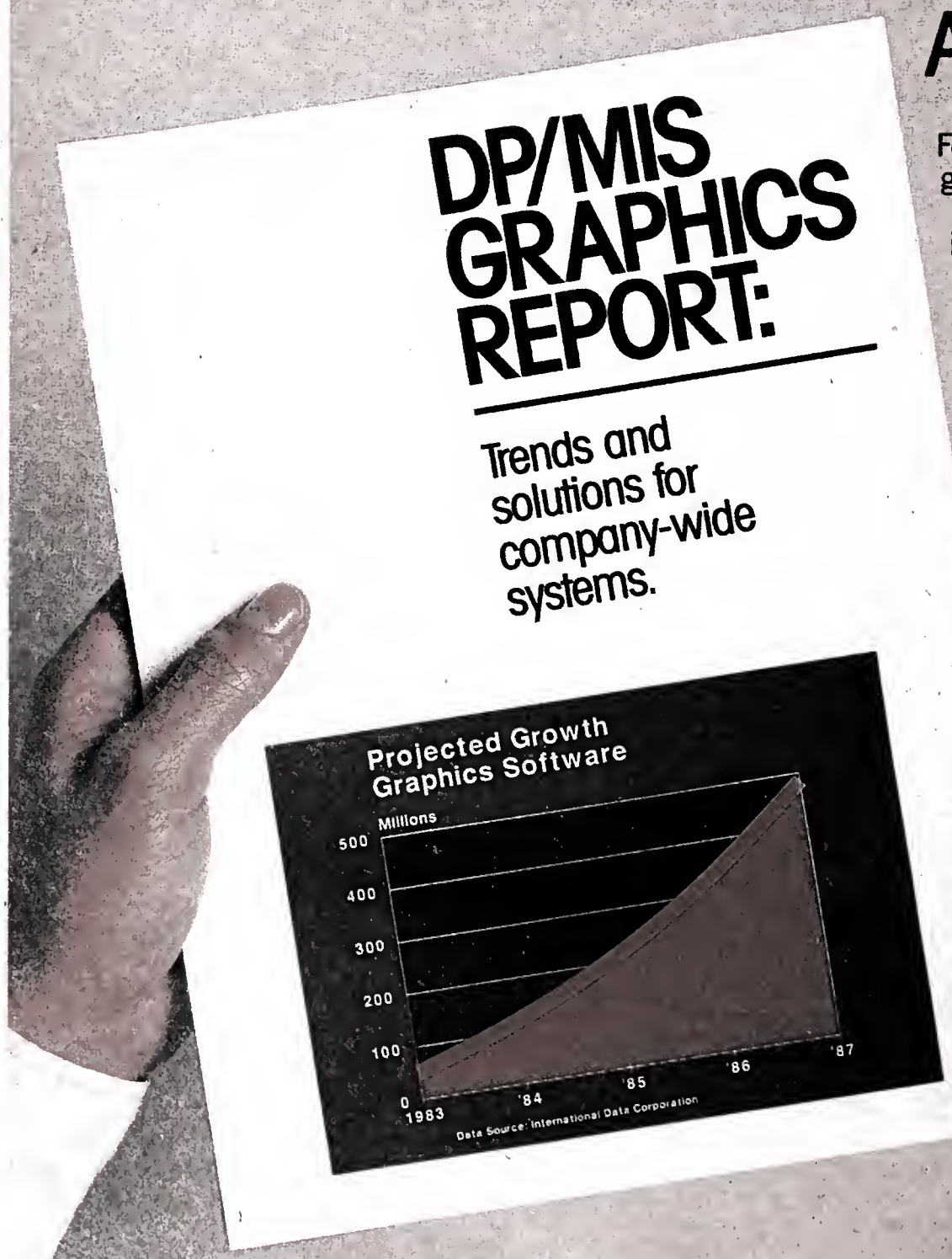

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Q. IF A MODEM IS A MODEM IS A MODEM, DOES IT REALLY MAKE A DIFFERENCE WHICH ONE I BUY?

A. The fact is, all modems are not created equal. For example, some modems are better signal processors than others. And these superior modems can make an important difference in your total network performance. A difference that can lead to important savings in telecommunications costs.

Q. How can a modem make a difference in my telecommunications costs?

A. The primary purpose of a network is to move information to and from end users and thereby improve their productivity. And a superior modem can improve the performance of your network in at least four areas: It can make your network more reliable. Give your end users faster response times. Minimize the time you and your people spend on network management. And a superior modem can also save you money in line charges.

Q. What makes a superior modem?

A. As you know, a modem converts a data stream into a signal that can be sent (usually over a phone line) from Point A to Point B.

Now that may sound simple enough, but there are a number of variables in that seemingly simple scenario. Such as, what's the distance between Points A and B? What's the line between the points? What's the condition and stability of the line? And many, many more. The point is, each variable carries technical implications that affect the design of the modem. And simply stated, a superior modem enjoys a superior design.

Q. Be specific. How can a superior modem save my company money?

A. Let's face it, modems are not the most expensive part of your telecommunications network. Chances are, line charges are. If you design a modem that can send data more reliably, then that modem can begin to affect your line charges. Every time a modem has a "hit," or an unsuccessful transmission of data, the data must be retransmitted, slowing down response time. The net effect is a reduction in the amount of information carried by the network.

If you use superior modems that give fewer hits, you'll have lower line costs per data unit transmitted and better throughput. Better throughput translates into time and cost savings.

Q. Can a superior modem correct the problem of faulty lines?

A. A superior modem can go a long way toward compensating for poor line conditions—and thus make marked improvements in the hit rate.

Take the IBM 3865 Modem, for example. It contains a custom microprocessor with an advanced algorithm that in effect enlarges the target area of acceptable transmissions. The result is that this reliable 9,600 bps modem can operate very effectively over unconditioned lines. Now imagine all the line conditioning charges you won't have to pay your common carrier.

Q. How can I go about proving the superiority of IBM modems?

A. Take your most troublesome line and put IBM modems on it. We believe you'll see an impressive improvement. Which leads us to another benefit of superior modems —you'll spend less time troubleshooting your network simply because line conditions that once were considered problems aren't really problems any more.

There are a number of other good reasons why you should consider IBM's line of 2,400, 4,800 and 9,600 bps stand-alone and rack-mounted modems. Not the least of which is that we've recently announced two new modems—the IBM 3833 and 3834—which feature lower prices, smaller packaging and improved serviceability. And like all IBM modems, they can fully utilize IBM's Communication Network Management capability.

The New IBM Modems

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Communication Facilities	4-wire, point-to-point or multipoint	

Both modems operate over nonswitched telephone lines that can be leased (common carrier or PTT) or private.

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Data base libel decision termed 'blow to info industry'

By Glenn Rifkin
CW Staff

In what one legal expert termed "a blow to the information industry," a controversial libel decision was handed down recently by the U.S. Supreme Court. In a 5-4 ruling, the court upheld a jury decision against the Dun & Bradstreet Corp. for libeling, via a computerized economic data base, Greenmoss Builders, Inc., a Vermont developer.

In upholding the Vermont jury's decision, the high court has ruled that the First Amendment protects for libel statements only in "matters of public concern."

Though the court did not define matters of public concern, the implication is that in libel cases that are not of public interest, private individuals or corporations may collect punitive damages along with compensatory damages for libel without proving malice or reckless disregard for the truth.

This alters the precedent established by the court in the 1974 *Gertz* v. *Robert Welsh, Inc.* decision.

The Greenmoss case originated in July 1976 when Dun & Bradstreet erroneously reported in its electronic online data base "Business Information Reports" that Greenmoss had filed for bankruptcy.

In fact, it was a former Greenmoss employee who had filed for bankruptcy; a 17-year-old high school student reviewing bankruptcy records in Vermont for Dun & Bradstreet had incorrectly reported the material. Greenmoss sued Dun & Bradstreet for punitive damages of $300,000 and compensatory damages of $50,000 and won in a decision upheld by the Vermont Supreme Court.

Decision seen as ominous

Though most experts agreed that the ruling's implications were as yet unclear, the decision was considered ominous by news organizations and the information processing industry.

Peter Marx, an attorney with the Boston law firm of Goulston & Storrs, representing the Information Industry Association, said the decision has put a heavy burden on electronic publishers, credit reporting services, computer data base producers and newsletter publishers by not defining "matters of public concern."

"These organizations are so varied and go to such focused audiences that it's going to be a lot easier to say whether something published in *The Wall Street Journal* is a matter of public concern than something coming out of the Dow Jones News Retrieval Service, even if it's the same information," Marx stated.

According to Marx, the ruling may serve to stifle the growing information industry by forcing smaller firms to become so careful that they stunt their growth. Those who heed the dangers risk being sued and forced out of business.

Dun & Bradstreet responded to the verdict in a press statement that said, "Business information services are of great value to the commerce of the nation, and, thus, activities of an information supplier should not be unduly inhibited by the fear of libel judgments based on occasional, unintentional error."

"This decision illustrates the difficulties these organizations face trying to build 21st century information businesses within a 19th century legal system," Marx said. "The law still hasn't come to grips with how to handle these new technologies in these contexts."

Ironically, the high court did not decide the case based on the issue of whether an organization was considered media or nonmedia a major point in the Vermont Supreme Court decision.

Many following the case had anticipated the U.S. Supreme Court to follow suit. By ruling out that distinction as a criteria, the court implied that it will treat both media and nonmedia groups the same under libel law.

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For more information, call or write Novell, Inc.
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*LAN Benchmark Report, May, 1985, Novell, Inc. and "Software, Not Hardware Key to LAN Performance," *PC Week* 1/15/85.

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Chip firm petitions to curtail dumping by Japanese

Tariff would double prices

BOISE, Idaho — Micron Technology, Inc., a 900-employee semiconductor firm based here, recently filed the U.S. chip industry's first petition to prevent dumping, or selling below cost, by Japanese chip makers.

If successful, the petition would impose duties on imported 64K-byte dynamic random-access memory (RAM) chips that would nearly double the cost of the chips in the U.S.

To impose the 94% duties sought by Micron Technology, the U.S. Commerce Department must find that the seven defendants are selling 64K-byte dynamic RAM chips below cost, and the U.S. International Trade Commission must rule that Micron's sales have been hurt by the practice.

The petition alleges predatory pricing by Fujitsu Ltd., Hitachi Ltd., Masushita Electric Corp., Mitsubishi Corp., NEC Corp., Oki Ltd. and Toshiba Ltd. Micron Technology charged that the production cost of a 64K-byte dynamic RAM chip is $1.36 and that the Japanese vendors' chips are selling for as little as 70 to 75 cents in the U.S.

Micron Technology's action is the strongest import-curbing move to date by a U.S. chip maker. The San Jose, Calif.-based Semiconductor Industry Association (SIA) recently called for an effort to equalize U.S. vendors' share of the Japanese chip market and the Japanese market share here but did not call for import restrictions.

Micron Technology attorney Larry Grant declined to directly comment on why his firm chose to pursue a stronger remedy than the SIA to shore up U.S. firms' declining share of the domestic chip market. Last month, Sunnyvale, Calif.-based Advanced Micro Devices, Inc. and a leading U.S. trade official verbally charged Hitachi with dumping 256K-byte erasable programmable read-only memory chips [CW, June 17].

Ashton-Tate revenue, profits jump

CULVER CITY, Calif. — Citing strong sales of its Dbase III and Framework microcomputer software packages, Ashton-Tate recently reported that its 1985 first-quarter revenue more than doubled and posted an almost fifteenfold increase in profits from the year-earlier period.

Sales for the quarter ended April 30 were $24 million, compared with $11.2 million in the first quarter of 1984. Profits soared from $149,000, or 2 cents per share a year ago to $2.3 million, or 25 cents per share.

Ashton-Tate President and Chief Executive Officer Edward M. Esber Jr. said international sales of the firm's products increased significantly in the past year, particularly in Europe and Japan. During the quarter, the company signed distribution agreements in Japan and Australia.

Ashton-Tate has also announced its intention to purchase the remaining 85% of outstanding stock of Forefront Corp., the developer of the Framework integrated software product now marketed by Ashton-Tate.

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Wang's management development center here, where the company hosted a one-day job placement fair. Like many of her colleagues among the 1,600 Wang employees laid off last month [CW, June 10], Currier found her faith in the strength of the computer industry had been shaken by the downturn of 1985.

"I still want to work in corporate MIS with IBM or Wang equipment," she said. "But I think it's time to get away from computer companies. In eastern Massachusetts, they're talking about how the industry won't be doing well for the next two years, at least."

'I'd rather stay in high tech'

"I could go back to banking, but I'd rather stay in high tech," said David Lops, a laid-off Wang revenue analyst. "[Before joining Wang] I had done financial analysis on the oil industry, when [the industry] collapsed. Now I'm faced with the same thing. The economy controls the fate of a lot of companies, and I feel very inferior to those forces right now."

Lops, 28, said Wang's layoff announcement came as a total shock. "Heavy rumors had been going around, but when they announced the July production shutdown [CW, April 1], we were reassured there would be no major layoffs. That's what really got me. I was really devastated ... I always thought the computer world was where you want to be."

"I haven't found anything here [at the job fair] yet," said Lamont Alford, 47, a five-year manufacturing supervisor at a Wang printed-circuit board production facility. "The company is making a very good effort to help us out, though. I think it's just a matter of time, but [my new job] might not be as close to home as I'd like."

Some 30 Massachusetts and New Hampshire companies attended the Wang job fair to collect resumes and conduct brief initial interviews with the newly available Wang employees. Although most represented were electronics-related firms such as GTE Corp., General Electric Co. and Analogic Corp., computer vendors were limited to Prime Computer, Inc. and Apollo Computer, Inc.

'Have to give Wang credit'

"We've slowed down somewhat, but not as much as others," said Hank Vezina, an Apollo human resources manager seeking to fill research and development engineering positions. "I have to give Wang credit — not many companies would do something like this. But it's still a tough way to find R&D engineers, because most go through agencies. Of the 1,600 Wang employees laid off, 400 to 500 at the most will come through here."

Since announcing the layoffs, Wang has also converted a former training facility in Burlington, Mass., into a job counseling center to teach interviewing techniques, help with resume preparation and offer job leads.

Other firms with massive layoffs, such as Data General Corp., have instituted similar programs after suddenly finding themselves in the job placement business.

Televideo sales dip 46%

SAN JOSE, Calif. — Televideo Systems, Inc. recently announced a loss for the second quarter as sales plummeted 46% from the year-earlier period.

The company announced a loss of $678,000 for the quarter, or two cents per share, compared with profits of $5.6 million, or 14 cents per share in the same period a year earlier.

Revenue dipped to $26 million, from $48.4 million in the second quarter of 1984. That compares with a similar first quarter, when sales dipped to $26.7 million, compared with $43.2 million during the same period a year earlier.

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one day and have five offers to choose from a week later," claimed Don Turniey, a service and maintenance engineer for large systems at Amdahl Corp. in Sunnyvale, Calif.

Though two of the companies he has worked for in the past three years have closed their doors, Turniey said he has never missed a day of work. When Storage Technology Corp. closed its Santa Clara, Calif., research operations in 1984, more than 100 companies sought the laid-off employees. He had four job offers before the division closed, Turniey said.

According to Turniey, some of his fellow engineers move from company to company like high-tech migrant workers, following the highs and lows of the industry.

But rehiring also can depend on the worker's geographic location, according to analysts. In areas with a high proliferation of electronics firms, like California's Silicon Valley and the Boston and Minneapolis areas, the chance of getting rehired is relatively good, said Rika Pirani, a California state labor market analyst.

The job market in the Silicon Valley is still growing, Pirani said. "The large number of microwave, software, telecommunications and defense firms in the area means there are still 40 pages of want ads in the Sunday paper," she said.

Growth in high-technology sectors is also apparent in the Boston area, noted Chris Anderson, a spokesman for the Massachusetts High Technology Council, Inc. in Boston. In spite of recent layoffs at computer systems manufacturers in the Boston area, other companies in that area are actively hiring. These include software companies and computer-aided design and engineering workstation manufacturers, Anderson said.

But, he warned, the hiring boom may be temporary. If the computer industry slump continues, more companies will institute hiring freezes, and new hiring will plunge.

Data General Corp. in Westboro, Mass., is providing its 1,050 laid-off workers in the U.S. with a two-day employment seminar staffed by an outside placement firm and with individual counseling sessions using outside trainers, said Steve Hobbs, corporate employment manager for the company.

"We have found that employees are usually pretty angry at the company, and it's important that outside employment counselors staff the outplacement centers," Hobbs said.

Control Data Corp. in Minneapolis, which laid off an undisclosed number of workers in June, is attempting to reassign the employees to temporary jobs inside the company and eventually move them to permanent CDC jobs, a spokesman said. Of 1,000 employees laid off at CDC last September, only 11 were terminated, he said.

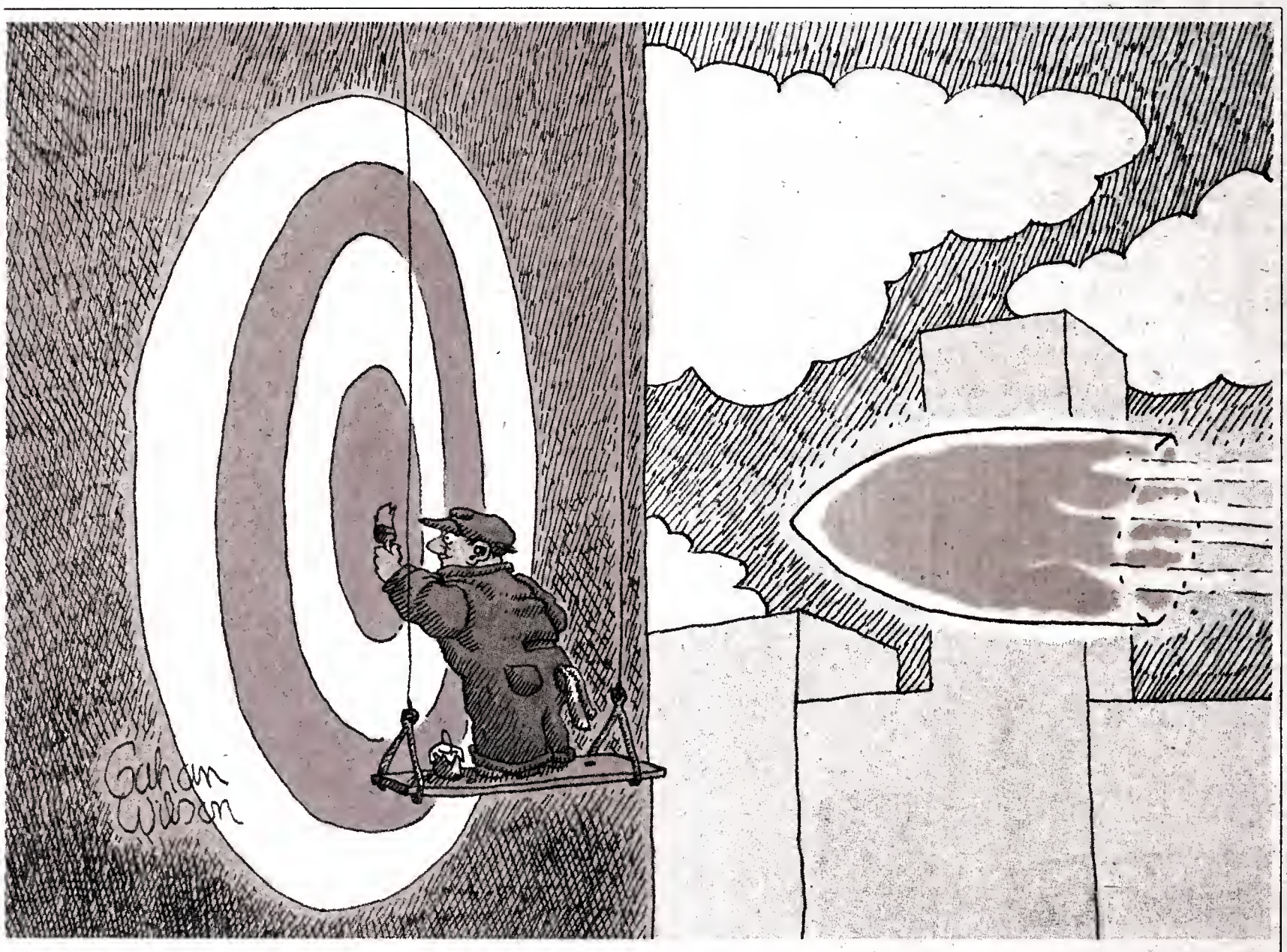
SLUMP from page 57

disk drive vendors by themselves have enough capacity to meet the current market demand, some of the more than two dozen players in the overcrowded marketplace are going to get squeezed out.

But the long-term impact of the slump of '85 will be even more significant for the Wangs, DGs and other companies playing in many markets. The growth rates and profit margins of the last five years simply will never be repeated. The firms that emerge from this slump in the best shape will be those that successfully lower their break-even points and become the true "lean and mean" firms that everyone likes to say they are.

In the good old days ("old" being relative, since the phrase applies to December 1984), "high tech" was virtually synonymous with economic prosperity, job creation and nothing less than the hope of the future. Steel-mill America was dying, the experts said, but the computer industry would rescue it with a boom that would last forever.

It's a shame so many people swallowed the hype and forgot that not even computer technology could outwit the most simple of economic principles — supply and demand. This year has brought a strong dose of reality to some success-bloated companies. It has shown that high tech is not so different from any other industry — where the winners are the smartest, best-managed and most realistic companies.



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FUTURE from page 57

oversees production of the reports and supervises Future Computing's research, while Isaacson runs the business side of the company and works one to one with client companies. Both hold doctoral degrees — he in electrical engineering, she in computer science — and each, according to observers, plays a complementary role in Future Computing's leadership. She is dynamic, he more reserved, according to those who know them.

Future Computing's 1,000 clients make up a "who's who" of the personal computing business and include such giants as IBM, Hewlett-Packard Co. and Apple. For anywhere from $7,500 to $100,000, clients get a package of services that usually includes consulting and telephone access to the company's researchers, explained Ken Orton, vice-president of sales and marketing.

Other services include seven newsletters; the monthly Storeboard report, a survey of 800 retail outlets; seminars and forums; and perhaps the most unique service of all, testing of personal computer hardware and sofware for compatibility with the IBM Personal Computer. The firm's testing lab has a staff of seven, and "almost all of the [personal computers] on the market today have been through [it]," Orton said.

One client, Infocom, Inc., a Cambridge, Mass.-based personal computer software firm, values Future Computing's data and advice. According to Richard Ilson, an Infocom senior scientist, "Our chairman has found them useful and has given Future Computing feedback when he hasn't found [it] useful."

Future Computing's research is done on the basis of forecasting off the current sales trend — but with a twist. The firm creates a model of the adoption curve of that product and fits the curve against the trend line. If the product is near the end of the adoption curve, for example, no amount of sales in previous years will offset the curve's impact on Future Computing's bleak expectations.

It was this method, Juliussen said, that brought Future Computing to within 5% of the mark when it predicted 1983 sales for the home personal computer market would hit $5 million. Unpredictables can enter into the equation, though; for 1984, using the same method in same market, Future Computing was off by 35%.

The adoption curve allows Future Computing to go out on a limb occasionally; for instance, it has predicted that laptop portable personal computers will be a hot-selling item in 1990, though they are presently selling slowly.

The firm's willingness to fly in the face of conventional wisdom — when the data warrants — has won it headlines, most recently for a report that concluded that 50% of all personal computer software in use in business was pirated (see story below). That survey, according to the man who supervised it, Joe Curry, represented a departure for Future Computing.

While previous studies had been based for the most part on data gained from retail store surveys, the software piracy study was based on responses of 13,000 end users. Curry said that Future Computing will place "more emphasis on end-user research" in future reports.

Speaking more broadly, Curry, who headed the firm's surveys and statistics group, said that Future Computing is evolving toward the use of "more statistical rigor" in its research. That does not mean that testing for accuracy was lax in the past, he added. In February 1984, Curry said, he became the first statistician hired by the firm. He worked there only 14 months, leaving to join an Idaho-based software development company.

While he was with Future Computing, Curry recalled, the corporate culture was marked by rapid growth. "Just about every day the company would change," he reminisced. Curry's observation was confirmed by analyst Tod Court. During the early years of the firm, Court recalled, the company was growing rapidly, and "jobs were changing real fast" — so quickly, in fact, that the printed outline of the corporate hierarchy became known as the "chart du jour."

Rapid growth, slow growth

Those were the days, roughly from 1981 to 1984, when the firm was gobbling up office space in the Richardson, Texas, shopping mall to which it had moved after it outgrew the spare bedroom at Isaacson and Juliussen's home. In that time, the company reorganized from five groups into three: personal computer products, distribution and markets.

According to Curry, growth has slowed considerably in the last eight months, a result of the slowdown in the computer industry as a whole. The boom times made the comments of Future Computing researchers grist for the mills of such publications as *The New York Times* and *Fortune* magazine. Aware of his firm's power to influence public opinion, Juliussen said he has alerted his employees that they are "playing with fire" when they air a controversial statement without substantiation.

Looking back, Juliussen said his only regret is that he failed to tell the makers of IBM Personal Computer clones to get into niches in the vertical personal computer market. Nearly all of the clone makers attended the research firm's forums on the Personal Computer, he explained, and all were angling for the limited shelf space in retail stores. Several of them have since fallen on hard times, as their dash for shelf space failed.

One year ago this month, McGraw-Hill, Inc. purchased Future Computing for an undisclosed sum. While reluctant to talk about his firm's new parent, Juliussen did admit that it is "a lot better banker than what we used to have."

Previously, he said, bankers would scratch their heads when approached for loans by the research firm; the bankers did not understand how so much value could be tied up in a research project, and they tended not to view data as suitable collateral.

Pressed for cash to expand into new lines of business, Future Computing turned to a Dallas real estate financier for the more than $40,000 needed to fund each of the research firm's industry forums. The sale agreement reportedly permits Isaacson and Juliussen to run the research firm without interference for four years.

AT A GLANCE

FUTURE COMPUTING INCORPORATED — McGraw-Hill

811 LBJ Freeway
Dallas, Texas 75251

Founded - 1980
Employees - 115
1984 Revenue - Estimated $7 million
1984 Profits - Not available
Area of expertise - The personal computer industry, especially its retail channels

Egil Juliussen
Chairman of the board

False findings?

DALLAS — It was a study destined to make news: Roughly half of all software in use by American business was pirated, Future Computing, Inc. said in a 1984 survey.

Almost immediately, it was challenged. The statistically minded knocked its sample size. A survey by Cupertino, Calif.-based Infocorp found only 22% of users own illegally copied software.

Joe Curry, who conducted the research while at Future Computing, said he believes the study was done scientifically and has been scoffed at because of misunderstanding. The sample size was statistically accurate, he said.

If there is a weakness in the study, Future Computing Chairman Egil Juliussen said, it is that the publishers "probably overestimated how many [of each title that] they sold." Juliussen said he found the survey's conclusion believable; another Future Computing survey has found that 68% of home users own pirated software.

FUTURE COMPUTING INCORPORATED — McGraw-Hill

Service	Description	User/Vendor Oriented	Price
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Home Division	Focus on home market for personal computers and software; reports on home computer distribution, consumers and hardwares; "Home Views" newsletter	Vendor	
Distribution Group			
Channels Division	Focus on personal computer retail channels, including computer specialty stores; directory of 3,700 retail stores; profiles on specific dealers	Vendor	
Value-Added Reseller (VAR) Division	Directed to VARs; research on specific vertical markets; profiles on VARs	Vendor	
Storeboard Division	Reports on monthly consumer purchases from a survey of 800 computer retail stores; separate reports on software, hardware and peripherals	Vendor	
Products Group			
Integrated Circuit Division	Focus on the integrated circuit industry; reports on robotics, integrated circuit usage in personal computers and trends in hardware; "IC Views" newsletter	Vendor	
Technology Division	Testing of hardware and software for compatibility with the IBM Personal Computer	Vendor	
Peripherals Division	Examination of the personal computer peripherals market, including printers, modems and mass storage devices	Vendor	

Source: Future Computing, Inc.

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   95. Other Vendor _____ (Please Specify)

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   E. Office Automation Systems

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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offs totaling almost 2,000 people.

Examples of struggling companies are plentiful. Six months ago, Sunnyvale, Calif.-based Advanced Micro Devices, Inc. lavished $700,000 on a massive Christmas party for employees. This summer, four-day workweeks are the order of the day.

This downbeat story is being echoed throughout the valley. National Semiconductor Corp. announced a 1,300-person layoff. Apple Computer, Inc. laid off 1,200 workers, closed three plants and revamped its marketing strategy. Hewlett-Packard Co., the valley's blue-chip firm, reported a 12% earnings drop for the latest quarter, compared with last year.

"It's the worst downturn ever," said O. Ralph Finley, a senior vice-president at Dataquest, Inc., a market research firm in San Jose, Calif. According to Finley, many valley semiconductor firms, especially hard hit by the recession, have resorted to desperate measures. Some have delayed posting order cancellations until the third quarter in an attempt to inflate this quarter's earnings estimates. Others have flatly refused to pay their bills until later in the year.

The sluggish sales of micros are a major factor in the industrywide downturn, said Aaron Goldberg, director of microsystems services at Santa Clara, Calif.-based International Data Corp. The personal computer industry slump is due primarily to the oversupply of computer hardware, which lacks sufficient networking capability, applications and trained users to make the equipment live up to its potential, he explained.

According to Goldberg, it may take the industry several years to recover from a shakeout fueled by an entrepreneurial outpouring of funds in 1982 and 1983. Most venture capital companies underwrote firms that merely produced variations of each other's products, and now, "the shakeout bloodbath is just starting," he said.

Micro firms have not been the only ones to suffer. HP, one of the valley's oldest electronics firms, has seen slumping financial performances across many areas of its business. According to Dean Morton, HP's chief operating officer, current troubles are caused by a reaction to the unrealistic user demand in 1984, amplified by the long-term effects of the strong dollar internationally.

"It's a difficult balancing act to try to be fair to employees, investors and the products themselves," Morton said, referring to sweeping cost-cutting measures instituted by the company in an attempt to avoid layoffs. On the optimistic side, however, he said sales of several HP products, such as the HP 3000 Series 37 mini and several personal computer peripherals, have not been affected.

Michael Murphy, editor of the "California Technology Stock Letter," a San Francisco-based investor newsletter, predicted that there will be an upturn after Labor Day but mostly for well-established firms like IBM and Apple. Personal computer sales, which doubled for several years, are expected to increase only 30% this year, but "sales would have to be up 200% to keep all the smaller personal computer-related companies in business," he said.

No quick upturn for slumping chip mart

SANTA CLARA, Calif. — The semiconductor industry has been hard hit by the prolonged computer industry downturn.

"Life in the semiconductor fast lane has definitely come to a screeching halt," said Michael Kubiak, statistics director at the San Jose, Calif.-based Semiconductor Industry Association.

At best, the industry's upturn will not occur before September, according to Kubiak, because of the normally sluggish summer cycle.

A Silicon Valley chip maker agreed with Kubiak's downbeat assessment. "There's no end in sight," said a spokesperson for Santa Clara, Calif.-based Intel Corp., where second-quarter profits plunged to approximately $11 million from approximately $50 million during the same period last year.

"There are two sides to the semiconductor equation," said Fred Zieber, manager of the semiconductor division at Dataquest, Inc., a market research firm in San Jose, Calif. Chip makers, driven by the soaring demand for chips over the past several years, kept adding to their manufacturing capacity. The semiconductor industry, however, underwent a 35% contraction over the last 10 months, causing capacity to be at least 40% in excess of today's needs, Zieber said.

A spokesman for Sunnyvale, Calif.-based Advanced Micro Devices, Inc., however, predicted an upturn in the chip market during the last quarter of the year. This renewed demand will be fueled by inventory obsolescence as firms buy 16-bit microprocessors and 1M-byte erasable programmable read-only memory chips for new products.

— Kathleen Burton

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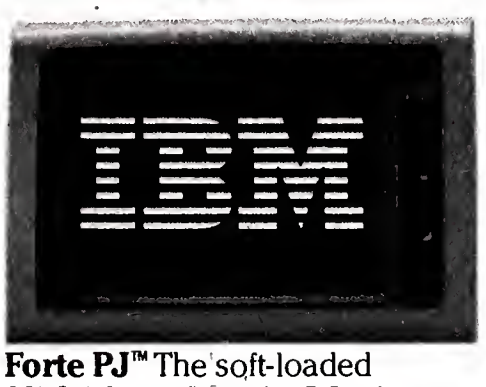

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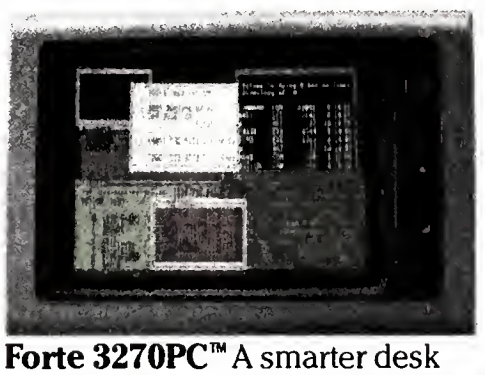

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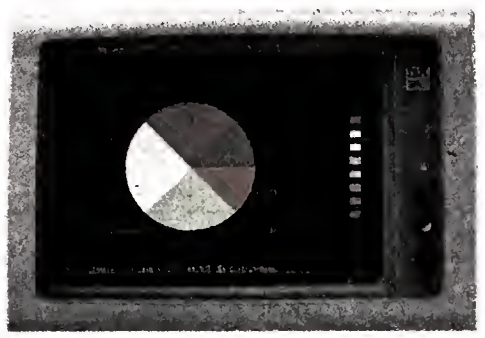

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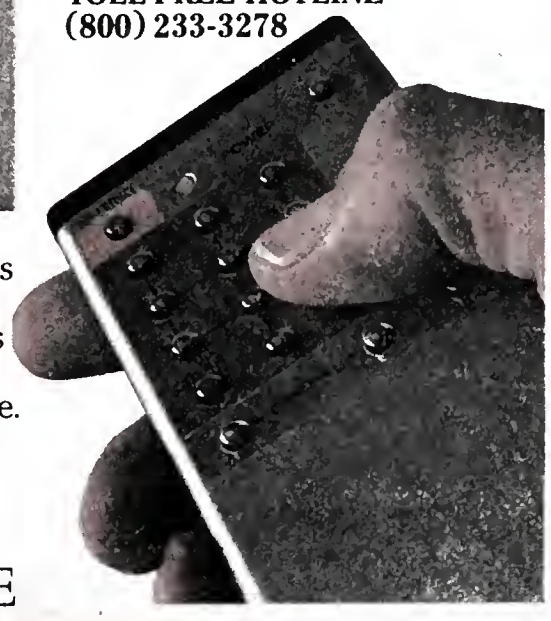

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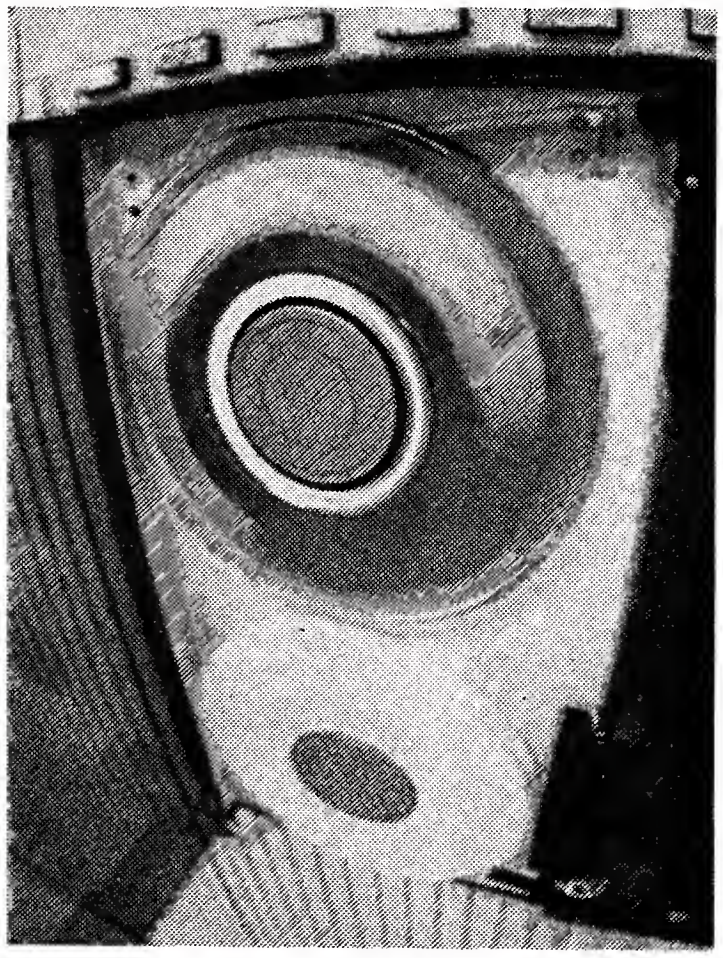

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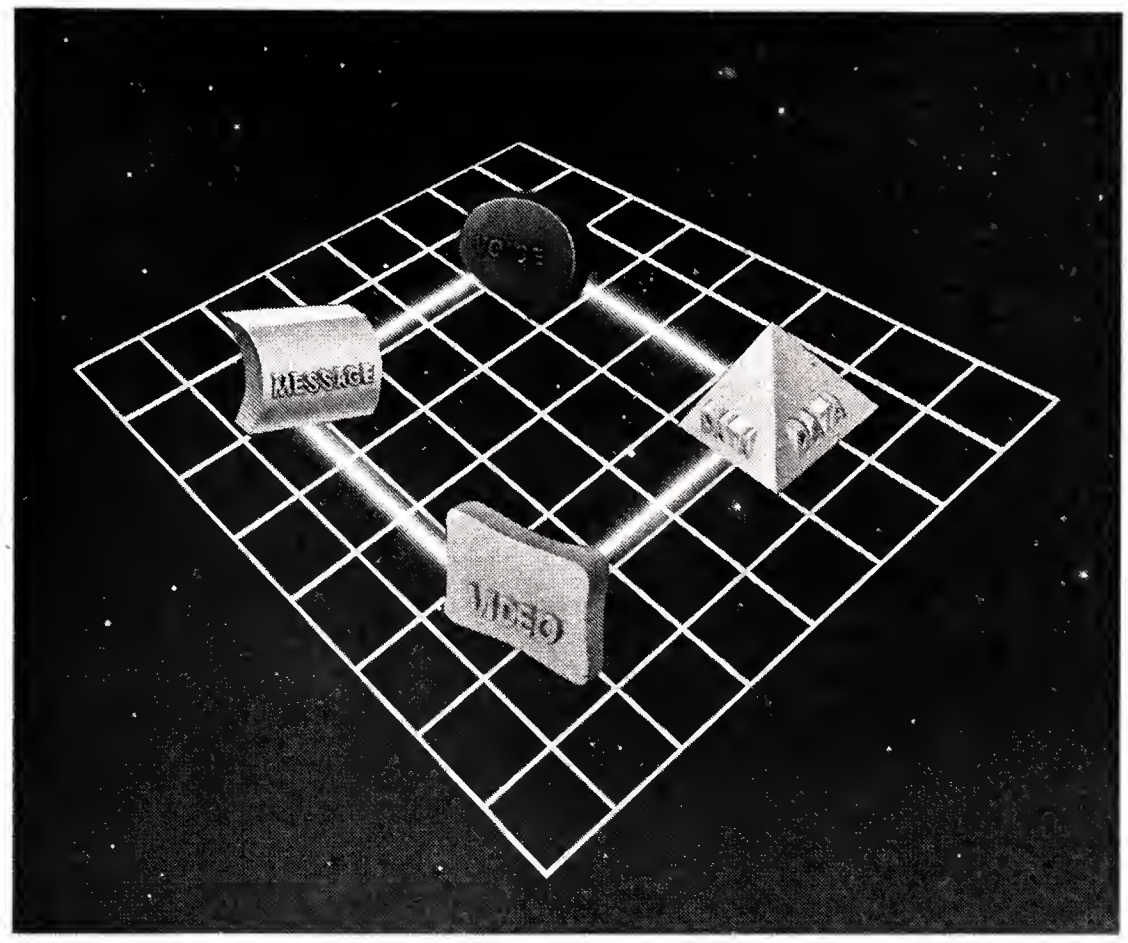
Telecommunications Opportunities with Boeing



For years, Boeing has been an industry leader in advanced technology, with a worldwide reputation for innovative design, engineering, integration, and management. We've developed one of the largest and most sophisticated privately managed telecommunications networks in the world. And now we're applying this expertise to assist other corporations and government agencies in designing, installing, and operating their own networks.

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IMS/VS DB/DC ONLINE PROGRAMMING USING MFS AND DL/I **By David Lee**

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Space Telescope Science Institute has positions available for highly motivated professionals who would like the opportunity to make a contribution to one of the most exciting scientific enterprises of the decade.

STScI, which will be the site for scientific operations of NASA's Space Telescope, is presently involved in building and integrating ground support systems for the operation of the satellite. Work involves design, coding, enhancement of systems as well as software development tools. On our prototype-oriented development team, you will have access to a wide range of languages on a project that spans the computing spectrum, including Artificial Intelligence, scientific programming, as well as state-of-the-art database management hardware. You will work in a small group, where your technical decisions will matter, and your expertise will be well recognized.

STScI offers an atmosphere of intellectual stimulation and reward and an excellent comprehensive benefits package in a university campus setting. If you are a qualified computer professional, with a solid background in practical applications of computer science, and would like to work in an environment that encourages initiative and technical excellence while affording the opportunity to learn new skills, please forward your resume, and a portfolio of your work to:

SPACE TELESCOPE SCIENCE INSTITUTE
Eric A. Gwaltney, Personnel Officer
3700 San Martin Drive
Baltimore, Maryland 21218

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Engineering

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DIGITAL COMMUNICATIONS ASSOCIATES, INC., is a leader in the design, manufacturing and marketing of highly sophisticated products for high-speed multi-host to terminal networks and for micro-to-mainframe communications.

Strong growth dictates extensive needs in several key areas of software engineering, technical support, technical writing, and computer operations. **DCA** needs people with 2+ years experience in the following areas of expertise:

• **SOFTWARE DESIGN ENGINEERS:** protocols, packet switching, modems, multiplexors, or other C language programming for real-time communications systems; experience needed in initial design, enhancements and modifications, or in software verification and diagnostics of hardware design; appropriate degree.

• **HARDWARE DESIGN ENGINEERS:** will design circuit boards, create firmware, and purchase components (power supplies, chips, etc.), to create modules or complete products. Some software knowledge required. Need solid experience in printed circuit board design; appropriate degree.

• **APPLICATIONS ENGINEER:** customer interface, systems specifications, site planning, overseeing installations, and network troubleshooting; need experience with voice/data networks (both hardware and software), solid understanding of distributed DP, muxing, etc., and ability to work with multi-vendor networks. Atlanta, Houston, Denver, San Francisco, Los Angeles (no relocation).

• **SYSTEMS MANAGER:** manage in-house computer systems for engineering design. Handle systems fine-tuning, allocation of CPU, disk space, etc., hardware/software installation, and some utilities and software development tool programming. Need solid VAX/VMS or 68000-based UNIX/C experience; degree preferred.

• **TECHNICAL WRITER:** need 1+ year writing specifications and documentation for hardware and software. Knowledge of data communications highly preferred. 4 year degree preferred.

• **MICROSYSTEMS ENGINEER:** will work closely with customers and users on **DCA's** micro-to-mainframe products. Need 2+ years in user support, operations, or programming of IBM mainframe systems with specific knowledge of TSO, CICS, CMS, MS-DOS, RS-232 interfaces, etc. Excellent communication skills are needed. Atlanta, Chicago, New York City, San Francisco (no relocation).

• **SALES:** need 2+ years selling mainframes, minis or data communications equipment. Need proven expertise in over 100% quota sales and systems versus component selling approach. Expansion openings in major U.S. cities.

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Technical Recruiter
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1000 Alderman Drive
Alpharetta, GA 30201

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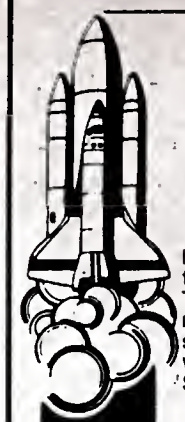

Innovation

FLORIDA OPPORTUNITIES

Lockheed Space Operations Company (LSOC) is the prime contractor to NASA and the U.S. Air Force for the Shuttle Processing Contract. This long-range contract involves our employees in the support engineering of the orbiter's on-board equipment and associated ground support systems. We have needs for qualified computer professionals who seek the stimulating, challenging environment that Lockheed Space Operations in Florida offers.

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As a contributing member of a team of Programmers and Programmer Analysts, you will be involved in the development, implementation, and support of a large scheduling and production system based on Honeywell DPS-8 environment utilizing COBOL. Preferred candidates for these positions will possess three or more years' experience and will have a good working knowledge of DM-4.

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We are located in the Florida Space Coast Resort area, where you will earn a nationally competitive income while paying NO state or local income taxes--AND enjoy the generally lower cost of Florida living. If you are qualified in either of the above areas, and you wish to further explore these opportunities, please call Don Quirk collect at (305)-268-4070 during normal working hours or send your resume for immediate consideration.

LOCKHEED SPACE OPERATIONS COMPANY
Employment Office
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RAND SYSTEMS CORPORATION

RAND SYSTEMS CORPORATION
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(313) 855-6877
All replies held in strict confidence

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State of South Dakota

Rewarding professional opportunities are available to experienced individuals who can work with and relate to large scale data processing organizations. We use dual 3033's and will expand to a 308X or 3090 next year. Our operations environment includes MVS, CICS and ADABAS/NATURAL. We support 200 IBM and compatible microcomputers with a variety of software.

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The capital city of Pierre is located on the Missouri River and is an outdoor person's paradise. If you are concerned about quality of life, but want challenge and opportunity too, write us!

Send resume, with Social Security number, and salary expectations to:

James K. McAtee
Commissioner

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OPERATING SYSTEMS SPECIALIST

is wanted by Nebraska Public Power District at the Columbus General Office. The applicant must have a degree in Computer Science or a related technical field, and at least two years experience as a systems programmer on the IBM MVS operating system. Thorough knowledge of internals of MVS, operating system structure, and MVS systems software maintenance using the System Maintenance Program (SMP) is considered essential. The applicant must be fluent in the use of IBM System/370 assembler language, and should have a working knowledge of one or more high level programming languages. Familiarity with SAS ®* or PL/1 will be considered an asset. A strong understanding of the basic concepts of IBM System/370 computer hardware architecture, including data storage devices, is mandatory. Salary range $27,550 to $34,400.

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Send resumes to:

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Human Resources Department
NEBRASKA PUBLIC POWER DISTRICT
P.O. Box 499
Columbus, NE 68601

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Ammie Thompson
Computer Specialist
Dunhill of Anderson, Inc.
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Anderson, South Carolina 29622
1-803-224-7917 (Collect)

PROJECT MANAGER (ANALYST) - To direct and coordinate planning and production activities of the electronic data processing and analysis for computer project; consult with management to define boundaries and priorities; determine information requirements, and confer with appropriate personnel to ensure cooperation and further define nature of project. Assign, schedule and review work and establish standards; prepare progress reports; introduce new program testing; review reports and analyze data requirements and flow; direct training of subordinates; oversee enhancement and maintenance of existing business applications systems; oversee implementation of complete online interactive systems using structured methodology. Must have experience with database (DMS II) operations, Burroughs mainframes, medium and small packages. Must also be familiar with GEMCOS, COBOL, and ALGOL. Must be willing to travel on short term basis, and be able to translate customer requests into usable computer systems. Must have demonstrated management experience. B.S. degree in Computer Science or related field together with 4 years experience in position or 5 years as Consulting Analyst. Salary - $30,000 per year. Apply with resume and proof of experience to Georgia Department of Labor, 2972 South Cobb Drive, Smyrna, GA. Control number GA5074376.

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The South Carolina Tax Commission is seeking a Manager proficient in mainframe DB technology to join the management team in its Information Resource Management Division. This position is responsible to the Director of the IRM Division for formulating, implementing, and directing the activities of a technical staff charged with data dictionary administration, data base administration, systems standards administration, systems quality assurance, voice/data communications, hardware and software evaluation and analysis. An undergraduate degree with 5 years technical software experience with a minimum of 2 years in a mainframe data base environment (preferrably IDMS) and one year supervisory experience or an equivalent combination of education and experience. Salary range is $31,770-$45,035. Send resume with salary history to:

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Personnel Department
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Develop, design and implement complete hardware and software systems for Burroughs equipment (micro-computer) in the area of computer networks, data communications and systems software. Develop applications to meet specific client user requirement. Client interfacing and management of teams of computer professionals on various sophisticated projects. Bachelors degree in Engineering or Computer Science. 3 years experience in job offered or 3 years as a systems analysis, computer consultant and/or computer teaching experience in a university setting. At least 2 years of above experience must be with micro computers including one year of on Burroughs and/or Prime equipment. 40 hour week, 9-5, $35,000 per year. Employer paid ad. Resumes to: 7310 Woodward Avenue, Room 415, Detroit, MI 48202. Reference #12985.

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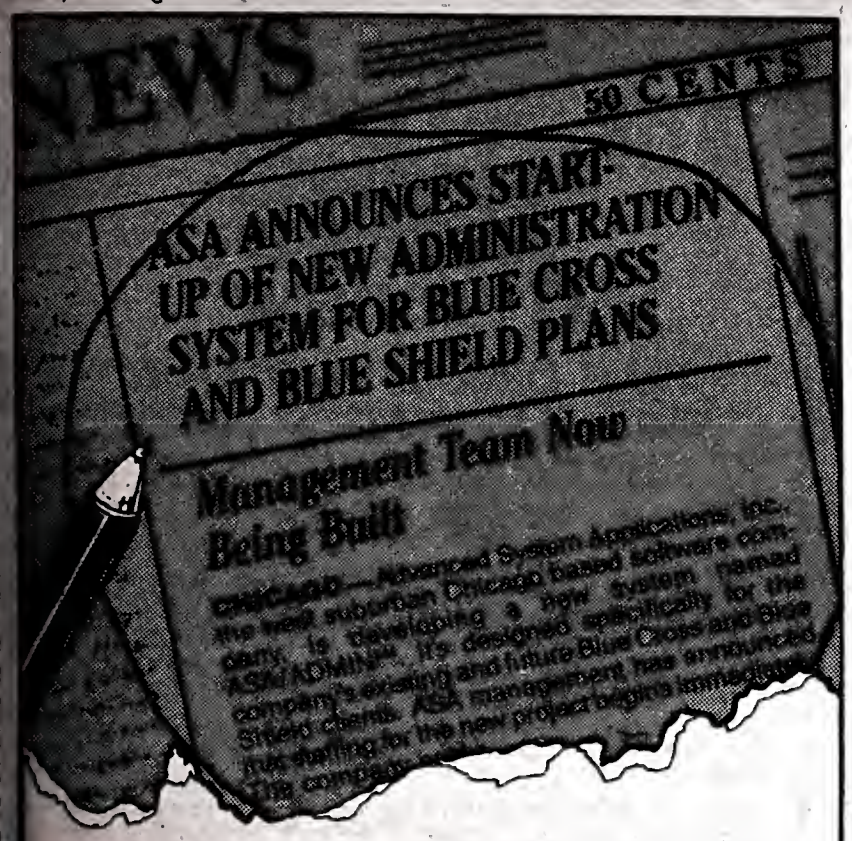
- Bachelor's degree in Computer Science or closely related field and three years of programming experience on large mainframe computer, with high proficiency in COBOL required. Hands on experience with on-line transaction processing and data base system and/or college application systems preferred. Extensive experience in the areas indicated will be considered in lieu of the formal education requirement. To apply, submit a letter of application and resume by July 15, 1985, to: A.J. Brooks, Director of Personnel, Sinclair Community College, 444 West Third Street, Room 7340, Dayton, OH 45402. Equal Opportunity Employer

data processing



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As head of the programming staff, you will schedule resources, prepare and administer budgets, prepare cost estimates, and provide technical consulting. Experience in IMS, CICS and DL/1 is necessary; knowledge of formal life cycle approach to systems development is required. Previous programming management experience is a must.

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*UNIX 'C'

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212-371-9600 or
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Att: Steven Schloss
201-539-7800

55 West Monroe Street
Suite 960
Chicago, Illinois 60603
Att: Steve Armintrout
312-332-4747

7505 Sussex Drive
Suite 12
Florence, Kentucky 41042
Att: Tom Heil
606-525-0429

1726 Cole Boulevard
Suite 327
Golden, CO 80401
Att: Linda Berry
303-278-8363

1220 Douglas Avenue
Suite 107
Longwood, Fla 32779
Att:Jim Sanders
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8585 N. Stemmons Freeway
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Accounting

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American Honda has an unsurpassed reputation for excellence in the automobile, motorcycle and power equipment industries.

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Requirements include experience in an IBM mainframe environment and technical knowledge of applications planning, design, review and implementation. Excellent communication and interpersonal skills are required as well as a degree in Business or Computer Science.

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DATA PROCESSING

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We serve over 5,000 users with data processing services. We have enjoyed an annual growth rate of over 35% during the past 5 years and we project continual growth. We invite you to grow with us.

We can offer you an excellent salary, an outstanding benefit program which includes tuition reimbursement, company paid health and dental insurance for you and your family, and the opportunity to join our staff of over 1,000 very talented people.

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with experience on either COMTEN 3690 or IBM 3725 and familiarity with various modems and multiplexors.

PROGRAMMER ANALYSTS
with COBOL, JCL experience in an IMS environment.

SYSTEMS PROGRAMMERS
with MVS/XA, VM, CICS or IMS experience.

DATA SECURITY MANAGER
with experience in managing data security in support of an IBM Host Center with knowledge of RACF.

If you feel you are qualified for any of these positions, we invite you to call us (collect) Tuesday or Thursday evening this week. If you would like a "no resume required instant interview" and can't call one of those evenings, please call during the business day and we'll make an appointment for another evening convenient to you. We will also, of course, respond to resumes.

LET US HEAR FROM YOU THIS WEEK. OUR NUMBER IS (305) 826-7417.

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5215 North O'Connor
2nd Floor
Irving, Texas 75039

HEALTHCARE M.I.S.

St. Luke's Hospitals, a progressive 434 bed acute medical center located in Fargo, ND, has two openings in Computer Services. The individuals selected will be in on the ground floor of the selection and implementation of a Hospital Information System.

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CLIENT SUPPORT COORDINATOR: Individual will provide training, consulting and implementation assistance to micro and mainframe users within the hospital complex. Prefer experience with micro computers in networking, communications, hardware and applications software; plus user support experience in an interactive mainframe environment. 3-5 years data processing experience.

Please submit resume and salary requirements to **Human Resources Department, St. Luke's Hospitals, 5th St N at Mills Avenue, Fargo, ND 58122.** An Equal Opportunity Employer.

FLORIDA PROG/ANALYST

Several S. Florida major corp's representing financial and mfg industry are expanding their development staff. Your tech bkgd must include 2 yrs large IBM, COBOL, CICS. Opportunity to expand your design skills and make a real impact within the corp. Excellent upward mobility. FEE PAID.

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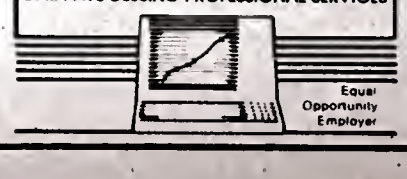

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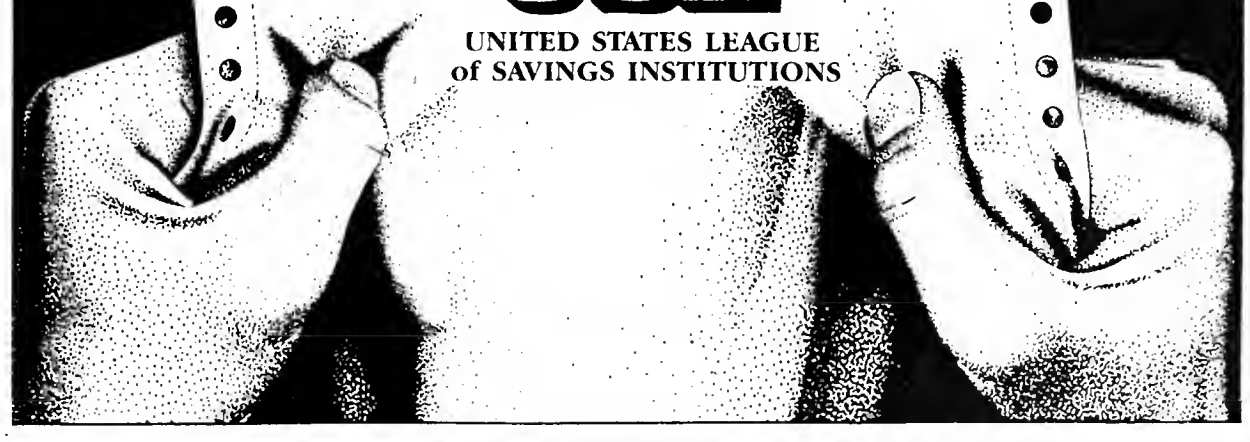

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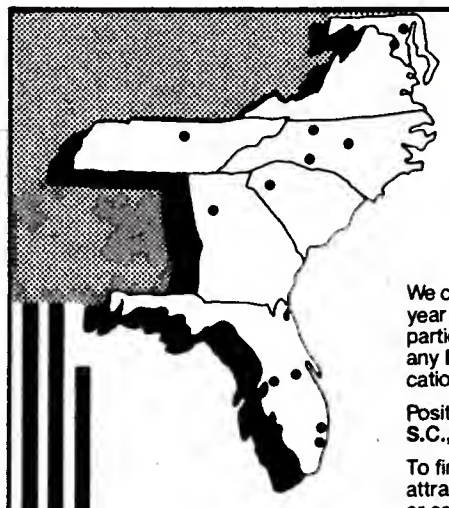

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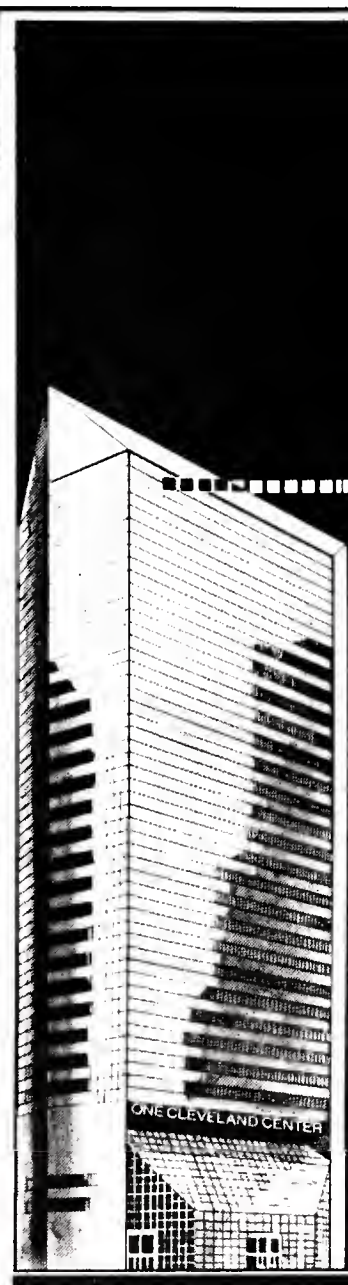

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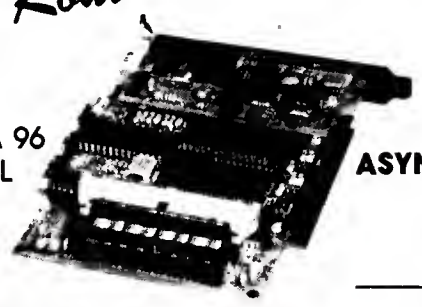

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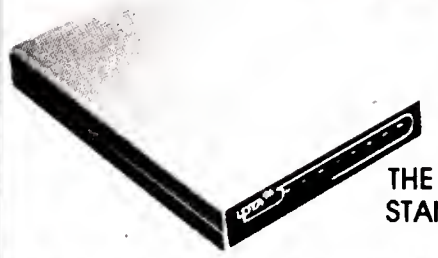

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Site tours must be taken by July 31, 1985 and a pre-proposal conference has been scheduled for 2:00 P.M. on August 9, 1985 at 25 Chapel Street, Room 606, Brooklyn, New York 11201.

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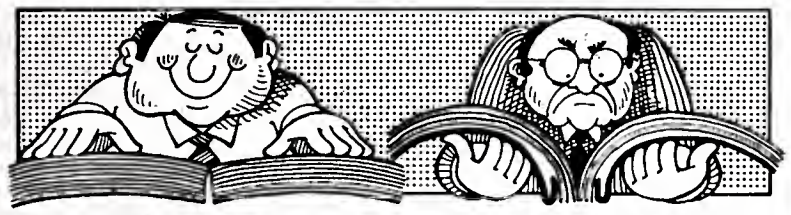

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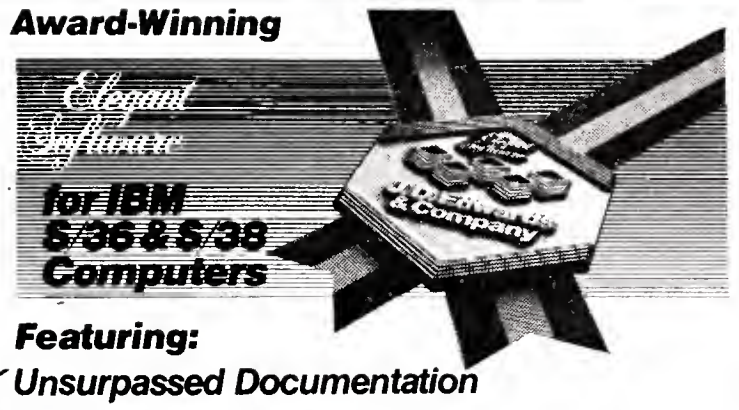

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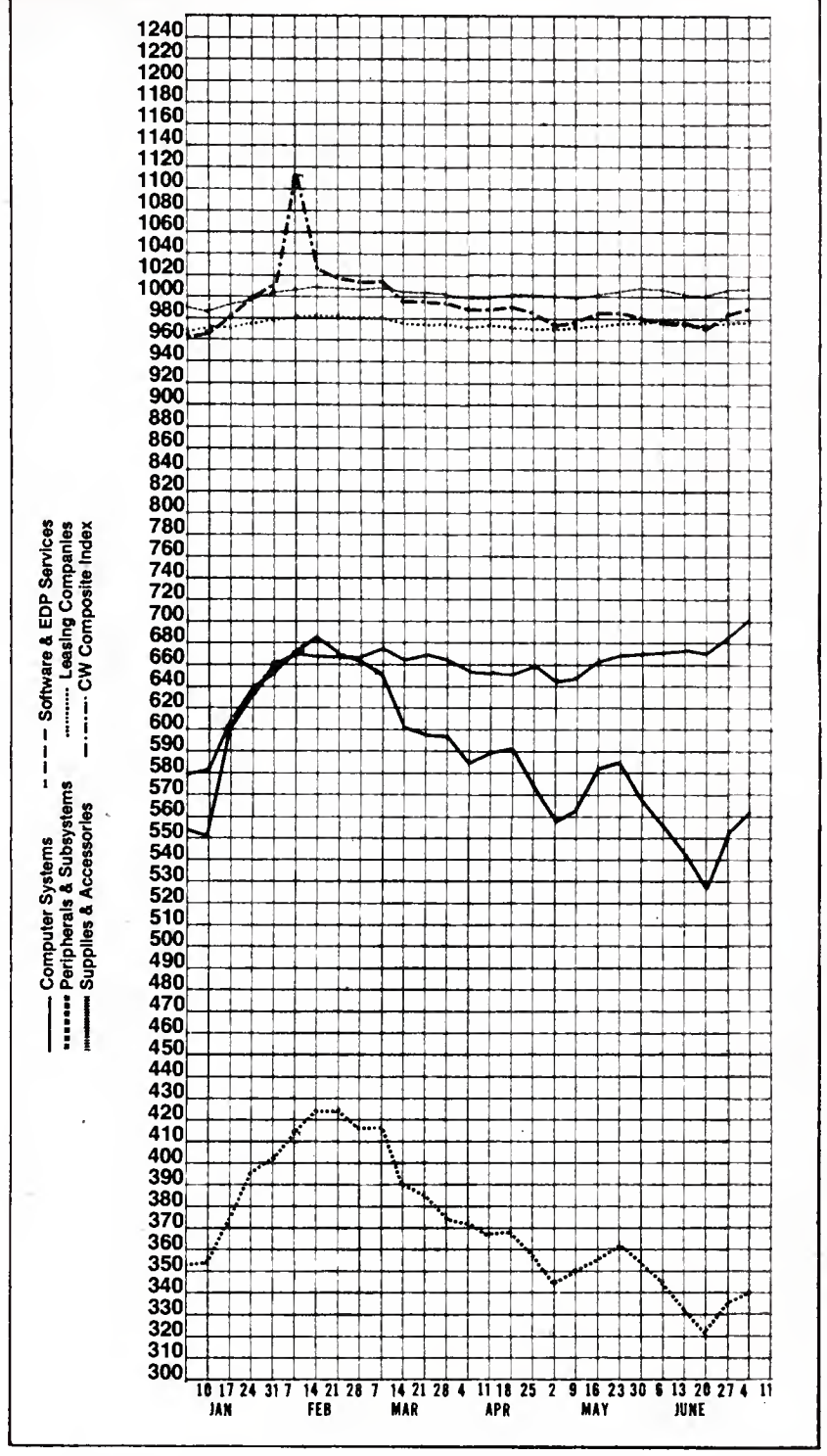

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CLOSING PRICES TUESDAY, JULY 2, 1985

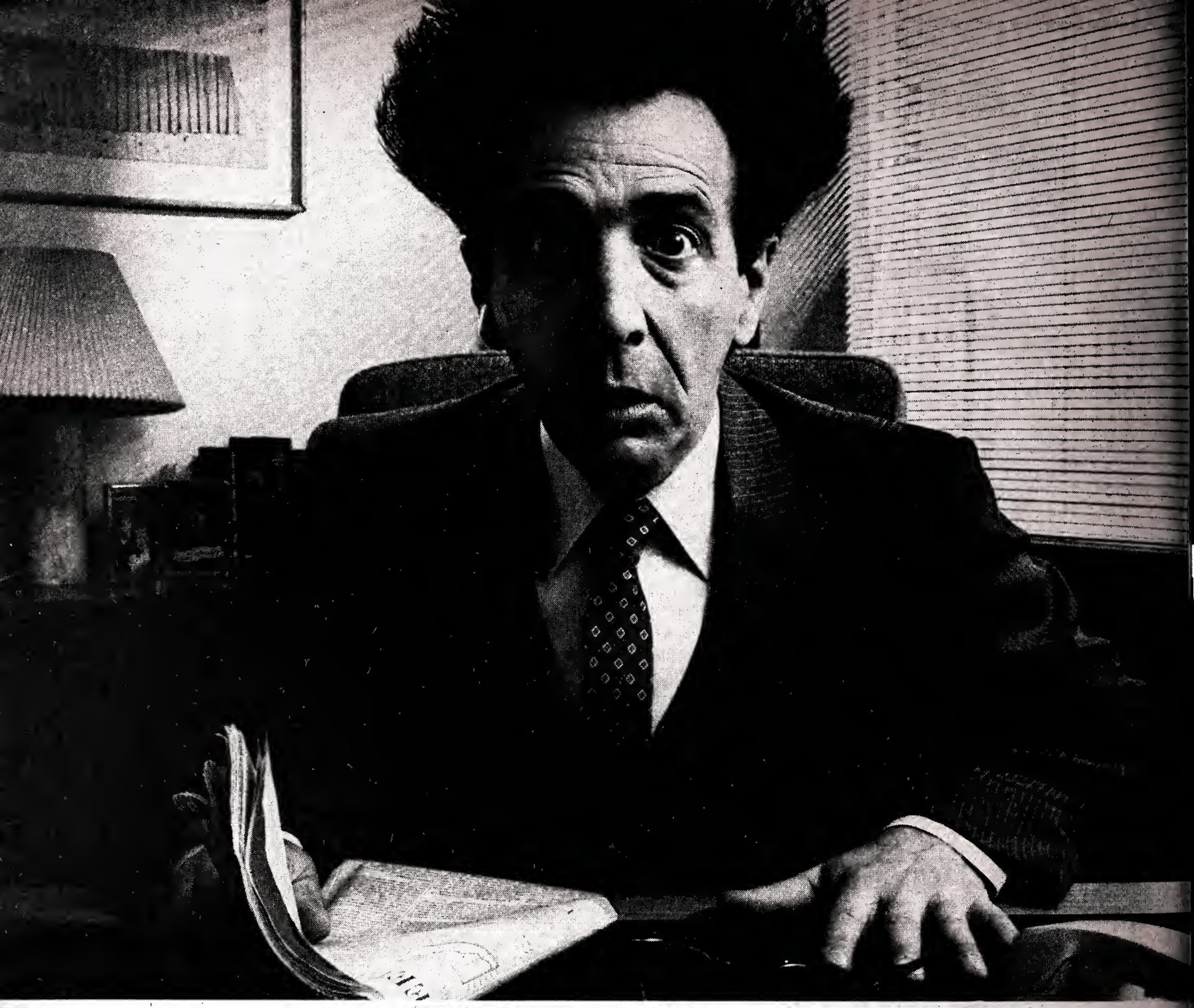
All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass 02139

EXCH		1985 RANGE (1)	CLOSE JULY 2 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	6- 24	8 1/8	- 1/8	-2.0
O	ALTOS COMPUTER SYST	7- 21	11	- 1/8	-1.1
A	AMDAHL CORP	10- 18	13 3/4	+1	+7.8
O	APPLE COMPUTER INC	16- 63	17 1/4	- 7/8	-4.8
N	AT&T	15- 24	23 7/8	+ 7/8	+3.8
N	BURROUGHS CORP	48- 88	58	+1 1/8	+1.9
O	COMPAQ COMPUTER CP	4- 15	8 3/4	+ 1/4	+2.8
O	COMPUTER AUTOMATION	3- 17	8 3/8	+1	+18.6
A	COMPUTER CONSOLES	5- 20	5 3/8	- 1/8	-2.2
N	CONTROL DATA CORP	25- 36	28 3/4	+1 1/8	+4.3
O	CONVERGENT TECHNOL	5- 41	7 1/4	+ 3/4	+11.5
O	CPT CORP	5- 12	8 1/2	- 3/8	-5.4
N	CRAY RESEARCH INC	38- 84	93 3/4	+ 3/4	+0.6
O	DAISY SYSTEMS CORP	14- 36	23 3/4	- 1/4	-1.0
N	DATA GENERAL CORP	33- 74	37 1/8	- 5/8	-1.8
N	DATAPOINT CORP	12- 28	12 7/8	+1	+8.4
N	DIGITAL EQUIPMENT	77-125	84 7/8	+1	+1.0
A	EECO INC	12- 18	13 3/4	+ 1/2	+3.7
N	ELECTRONIC ASSOC.	3- 7	4 1/4	- 1/8	-2.8
N	FLOATING POINT SYST	13- 31	28 3/4	+2 1/8	+7.8
N	FOXBORO	25- 38	25 5/8	+ 7/8	+3.5
N	GOULD INC	20- 32	25	+2	+8.8
N	HARRIS CORP	23- 35	27 5/8	- 1/2	-1.7
N	HENLETT-PACKARD CO	31- 44	35 5/8	+ 5/8	+1.7
N	HONEYWELL INC	48- 88	81 3/4	+ 1/4	+0.4
N	IBM	88-137	124 3/8	+1 1/4	+1.0
O	IPL SYSTEMS INC	1- 14	2	+ 1/4	+14.2
N	ITT CORP	21- 42	31 1/4	- 3/4	-2.3
N	M/A-COM INC	13- 24	20 1/8	+2	+11.0
N	MANAGEMENT ASSIST	2- 28	2 3/8	0	0.0
N	MATSUSHITA ELEC(ADR)	52- 81	58 1/4	- 1/4	-0.4
N	MODULAR COMPUTER SYS	6- 10	8 1/2	- 1/4	-3.7
N	MONARK DATA SCI	2- 17	2 1/4	0	0.0
N	MOTOROLA INC	28- 44	34 3/4	+1	+2.8
N	NAT'L SEMICONDUCTOR	10- 17	12 3/8	+ 1/8	+1.0
N	NBI INC	13- 24	18 1/4	- 3/8	-2.0
N	NCR	21- 31	31 3/8	+1 1/8	+3.7
N	PERKIN-ELMER	18- 30	25 3/4	+ 3/8	+1.4
N	PRIME COMPUTER INC	11- 20	18 1/2	+ 3/8	+2.0
N	SPERRY CORP	35- 57	53 3/4	+ 1/4	+0.4
O	STRATUS COMPUTER INC	8- 17	14	-1 1/4	-8.1
O	TANDEM COMPUTERS INC	15- 40	17 3/4	0	0.0
N	TANDY CORP	24- 37	34 3/4	- 1/4	-0.7
O	TELEVIDEO SYSTEMS	2- 41	2 1/8	- 1/2	-18.0
O	TELXON CORP	8- 21	17	+1 1/4	+7.8
N	TEXAS INSTRUMENTS	88-150	98 1/2	+1 3/4	+1.8
A	ULTIMATE CORP	10- 24	12 1/4	+1 7/8	+18.0
O	VECTOR GRAPHICS INC	0- 8	1/4	- 1/16	-15.2
A	WANG LABS "B"	15- 32	17 1/2	+ 1/8	+0.7
A	WANG LABS "C"	18- 32	18 1/4	+ 1/2	+2.8
N	XEROX CORP	35- 54	54 1/4	+2 1/4	+4.3
	LEASING COMPANIES				
N	COMDISCO INC	8- 17	15 1/8	+ 7/8	+8.1
O	CONTINENTAL INFO SYS	5- 18	11 1/4	+ 3/8	+3.4
O	FINALCO GROUP INC	4- 12	4 1/8	+ 1/4	+6.4
O	PHOENIX AMERICAN INC	2- 17	2 5/8	- 3/8	-12.5
O	SELECTERN INC	8- 21	8 1/4	+ 1/4	+2.7
N	U.S. LEASING	28- 44	37 1/2	+1 1/8	+3.0
	COMPONENTS				
N	ADVANCED MICRO DEV	23- 41	28 3/4	+1	+3.8
O	ADV'D SEMICONDUCTOR	11- 38	10 1/2	- 1/4	-2.3
N	ANALOG DEVICES INC	18- 25	20 5/8	- 7/8	-4.0
O	ANALOGIC CORP	10- 31	12 1/4	+ 3/8	+3.1
N	APPLIED MAGNETICS CP	8- 21	13 5/8	+ 1/4	+1.8
O	NADCO CORP	4- 12	4	- 1/8	-3.0
O	NICRO MASK INC	6- 18	7 1/8	+ 1/4	+3.8
N	TERADYNE	20- 35	23 5/8	+ 3/8	+1.8

EXCH		1985 RANGE (1)	CLOSE JULY 2 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 8	3 1/2	- 1/4	-6.6
N	ADVANCED SYSTEMS INC	8- 22	11 1/4	+ 1/4	+2.2
O	ADS COMPUTERS INC	10- 32	16	+1 3/4	+12.2
O	AMERICAN SOFTWARE	8- 20	12 3/4	+ 1/2	+4.0
M	ANACOMP INC	1- 5	2 5/8	- 3/8	-12.5
O	ANALYSTS INTL CORP	5- 17	10	+ 1/4	+2.5
A	APPLIED DATA RES	18- 36	36 7/8	+1 5/8	+4.8
O	ASHTON TATE	8- 15	8 5/8	+ 1/2	+5.4
O	ASK COMPUTER SYSTEMS	11- 24	13	0	0.0
S	ASTRODYNE COMP INC	1- 7	2 7/8	- 1/8	-4.1
M	AUTOMATIC DATA PROC	30- 53	52 1/2	- 1/4	-0.4
O	COMPUTER ASSOC INT'L	15- 35	27 3/4	+ 3/4	+2.7
O	COMPUTER HORIZONS	8- 20	8 3/8	+ 1/2	+5.5
O	COMPUTER NETWORK	5- 11	7 1/4	- 1/4	-3.3
M	COMPUTER SCIENCES	11- 18	17 5/8	+ 3/8	+2.1
O	COMPUTER TASK GROUP	8- 17	17	+2	+13.3
O	COMPUTER USAGE	1- 18	1/4	0	0.0
O	COMPUTONE SYSTEMS	4- 23	8 1/4	0	0.0
O	COMSERV CORP	1- 18	3 1/2	+ 1/8	+3.7
O	COMSHARE	8- 14	8	+ 1/8	+1.4
M	CULLINET SOFTWARE	12- 33	27 3/8	+ 3/8	+1.3
O	CYCARE SYSTEMS INC	18- 27	23 1/4	0	0.0
O	HODAN SYSTEM INC	4- 27	3 3/4	- 1/4	-8.2
N	GENERAL ELECTRIC CO	48- 65	62	+ 3/4	+1.2
N	GEML MOTORS E (EDS)	18- 41	41 1/4	+ 3/4	+1.8
N	GTE CORP	38- 45	40 3/8	0	0.0
M	INFORMATICS GENERAL	14- 27	28 5/8	+ 1/4	+0.8
O	INFORMATION SCIENCE	2- 17	1 1/2	- 1/4	-14.2
O	INFOTRON SYSTEMS CP	15- 43	18 1/4	-1 1/4	-6.4
O	KEANE ASSOCIATES	8- 18	18 1/4	+1	+5.7
A	LOGICON	18- 34	34	+1	+3.0
O	LOTUS DEVELOPMENT CP	15- 40	28 3/4	+ 1/4	+0.8
O	NCI COMMUNICATIONS	8- 28	10 3/8	- 1/4	-2.3
O	MNGT SCI AMER INC	8- 33	15 3/8	- 1/8	-0.8
O	MATHEMATICAL APP GRP	3- 18	3 1/4	0	0.0
O	MICOM SYSTEMS INC	18- 50	18 3/4	-2 3/4	-12.7
O	MICROPRO INT'L CP	2- 10	2	0	0.0
O	NATIONAL DATA CORP	8- 26	13	+ 7/8	+7.2
O	ON-LINE SOFTWARE INT	4- 28	7 1/4	0	0.0
O	PANSOPHIC SYSTEMS	11- 30	23 3/8	+ 7/8	+3.8
N	PLANNING RESEARCH	10- 15	14 5/8	+ 3/4	+5.4
O	POLICY MGMT SYSTS CP	22- 35	22 1/8	+ 5/8	+2.9
O	PROGRAMMING & SYS	4- 8	5 1/2	- 1/4	-4.3
O	REYNOLDS & REYNOLD	28- 53	41 3/4	+2 1/4	+5.5
O	SEI CORP	11- 34	18 1/4	0	0.0
O	SHARED MEDICAL SYST	23- 43	29 1/8	- 1/4	-0.8
O	SCIENTIFIC COMPUTERS	5- 14	8	+ 3/8	+8.8
O	SOFTWARE AG	8- 21	16 1/2	+ 3/4	+4.7
N	URS CORP	10- 14	11 1/8	+ 1/8	+1.1
N	UCCEL	7- 17	15 1/8	+1 3/4	+13.0
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 7	4	0	0.0
A	ANDERSON JACOBSON	3- 11	3	- 1/8	-4.0
O	AST RESEARCH INC	7- 20	18 3/4	+ 1/2	+3.0
O	AUTO-TROL TECHNOLOGY	7- 28	6 1/2	0	0.0
O	AVANT-GARDE COMPUTNG	7- 28	8	+1	+14.2
O	BANCTEC INC	5- 22	8 5/8	+ 1/2	+8.1
A	BEEHIVE INT'L	1- 7	1/2	0	0.0
N	BOLT,BERANEK & NEW	17- 30	27 3/8	+1 5/8	+6.3
O	CAMBEX CORP	1- 3	1 5/8	-	-3.7
N	CENTRONICS DATA COMP	3- 14	2 5/8	0	0.0
A	CETEC CORP	6- 12	6 1/8	- 1/8	-2.0
A	COGNITRONICS	4- 8	5 1/2	+ 5/8	+12.8

EXCH		1985 RANGE (1)	CLOSE JULY 2 1985	WEEK NET CHNGE	WEEK PCT CHNGE
M	COMPUGRAPHIC CORP	28- 37	25 3/4	+1 1/4	+4.8
O	COMPUTER TRANSCEIVER	1- 10	3/4	0	0.0
M	COMPUTERVISION CORP	12- 48	14 3/8	+ 3/8	+2.8
N	COMRAC CORP	11- 17	13 1/2	+ 1/2	+3.8
A	DATAPRODUCTS CORP	11- 25	12 3/4	+ 3/4	+6.2
A	DATARAM CORP	4- 12	4 3/8	+ 5/8	+15.5
O	DATA SWITCH CORP	4- 41	4 1/2	0	0.0
O	DATUM INC	5- 17	5 7/8	+ 1/4	+4.4
O	DECISION DATA COMPUT	8- 19	13 1/2	+ 5/8	+4.8
O	DOCUTEL-OLIVETTI	3- 39	5 1/4	0	0.0
M	ELECTRONIC M & N	5- 8	7 5/8	- 1/8	-1.8
O	ENDATA, INC	3- 15	3 1/2	- 1/2	-12.5
O	EVANS & SUTHERLAND	11- 50	18	+ 1/8	+0.7
O	GAMDALF TECHNOLOGIES	8- 14	5 5/8	-1 1/8	-16.5
M	GEN'L DATA COMM INC	12- 20	11 5/8	- 7/8	-7.0
M	HAZELTINE CORP	23- 33	25 5/8	+2 5/8	+11.4
O	ICOT CORP	3- 8	8	+ 1/8	+2.1
O	INFORMATION INTL INC	10- 18	14 1/2	+ 3/4	+5.4
O	INTECON INC	4- 21	4 5/8	+ 1/8	+2.7
O	INTEL CORP	24- 45	25 3/4	+ 3/4	+2.8
A	LUNDY ELECTRONICS	7- 14	12 1/4	- 1/4	-2.0
O	MEDADATA CORP	3- 8	4 7/8	+ 1/8	+2.6
A	MBI DATA CORP	7- 18	8 1/8	+ 7/8	+12.0
M	MASHUA CORP	19- 28	26 7/8	+ 1/4	+0.8
O	METWORK SYSTEMS CORP	16- 34	21 7/8	- 1/2	-2.2
M	MO AMERICAN PHILIPS	30- 45	35	- 5/8	-1.7
M	NORTHERN TELECOM LTD	30- 42	38 5/8	+ 1/4	+0.8
O	OMEX	1- 6	1/2	0	0.0
M	PARADYNE CORP	9- 18	10 1/4	+ 1/4	+2.5
A	PENRIL CORP	9- 14	9 1/4	+ 1/8	+1.3
M	PLESSEY CO (ADR)	20- 35	19 7/8	- 5/8	-3.0
O	PRINTRONIX INC	8- 34	10 1/4	+ 1/2	+5.1
O	ONS INC	8- 17	10	+ 3/4	+8.1
O	RANTEK CORP	3- 23	3 3/8	+ 3/8	+12.5
M	RECOGNITION EQUIP	9- 17	11 1/8	+1 1/8	+11.2
N	SANDERS ASSOCIATES	32- 51	37	+1	+2.7
O	SCAN-TRON CORP	8- 18	14 1/4	0	0.0
N	SCIENTIFIC ATLANTA	8- 14	12 1/2	+ 7/8	+7.5
O	SEADATE TECHNOLOGY	4- 20	8 3/8	+ 1/8	+2.0
N	STORAGE TECHNOLOGY	2- 12	2 1/4	0	0.0
O	SYKES DATATRONICS	1- 13	5/8	- 1/8	-16.8
A	T BAR INC	5- 11	5 3/4	- 1/4	-4.1
A	TAB PRODUCTS CO	13- 20	18 3/8	- 1/8	-0.6
O	TANDON CORP	4- 35	4 7/8	+ 1/8	+2.8
A	TEC INC	6- 13	10 1/2	- 3/8	-3.4
N	TEKTRONIX INC	52- 89	81 5/8	+4 1/2	+7.8
N	TELEX	19- 47	38 1/4	- 1/2	-1.2
O	TESDATA SYSTEMS CP	2- 17	1 3/4	- 1/8	-8.5
N	TIMEPLEX INC	13- 23	18 1/8	+ 5/8	+3.5
O	VISUAL TECHNOLOGY	1- 28	5/8	- 1/8	-16.8
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	17- 27	24 3/4	+ 3/4	+3.1
N	BARRY WRIGHT	18- 33	18 3/8	+ 3/8	+1.8
A	DUPLEX PRODUCTS INC	22- 36	35	- 1/4	-0.7
N	ENMIS BUS. FORMS	16- 40	36 3/8	- 1/4	-0.8
N	3M COMPANY	88- 98	78 3/4	+1 1/4	+1.5
N	MOORE CORP LTD	18- 53	20 3/4	+1 1/2	+7.7
O	STANDARD REGISTER	14- 35	34 3/4	+1 1/4	+3.7
M	WALLACE COMP SERVICE	23- 38	38 7/8	- 1/8	-0.3

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR



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